

Department of Energy (DOE) FY 2006 Report to Congress

**Laboratory Directed Research and Development
(LDRD)
at the DOE National Laboratories**



December 2006

Table of Contents

Executive Summary	1
1. Introduction	2
1.1 Background	2
1.2 Purpose of the Report	2
2. FY 2006 LDRD Program	4
2.1 Financial Information	4
2.1.1 LDRD Funding Mechanism	4
2.1.2 FY 2006 Expenditures	4
2.1.3 FY 2006 LDRD Allocation Percentages	5
2.2 Workforce Development	6
2.3 LDRD and the Work for Others (WFO) Program	8
3. FY 2006 PDRD and SDRD Programs	10
3.1 Plant Directed Research and Development Programs	10
3.2 Site Directed Research and Development Program	10
4. Report Conclusions	11
Note 1 Listing of FY 2006 Projects	
Appendix 1 Secretarial Affirmation	A1

FY 2006 LDRD Report to Congress

Executive Summary

The Laboratory Directed Research and Development (LDRD) program at the Department of Energy's (DOE's) multi-program national laboratories, as well as analogous programs at the Department's plants and at the Nevada Test Site, are Congressionally authorized programs designed to build capability to maintain the vitality of these nationally important institutions. This document fulfills all Congressionally requested LDRD program reporting requirements.

Overall, the multi-program national laboratories included in this report devoted approximately \$476 million to LDRD, funding projects ranging in size from less than \$5,000 per year to over \$3 million, addressing topics that span the entire range of DOE's broad scientific mandate. An analysis of LDRD investments compared to the sources of laboratory funding indicates the LDRD benefits are commensurate with the funding received from defense, non-defense, and Department of Homeland Security (DHS) sources. In addition, the production plants invested approximately \$20 million through the Plant Directed Research and Development (PDRD) program to fund science and technology projects with the potential to enhance the plants' mission-related manufacturing capabilities, operations, and core technical competencies. Also, the Nevada Test Site invested approximately \$6 million through its Site Directed Research and Development (SDRD) Program.

In response to the fiscal year (FY) 2002 Energy and Water Development Appropriations Conference Report, the Secretary issued guidance requiring all LDRD laboratories to notify other Federal agencies concerning LDRD charges. With the creation of the DHS, there are additional provisions for the notification of LDRD charges, as well as requirements for acknowledgements regarding the benefits of LDRD, prior to final approval of all DHS projects (see Section 2.3). Collectively these policies provide the basis for the Secretary's affirmation that all FY 2006 LDRD activities derived from funds of other Federal agencies have been conducted in a manner that supports the science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts providing funds to those agencies. That requested affirmation is included as Appendix 1.

An important component of the LDRD program's contribution to the laboratories' future is its ability to attract promising young scientists and engineers to the institutions. LDRD-funded post-doctoral appointments, for example, supported about 41 percent of all post-doctoral scientists and engineers at the reporting multi-program national laboratories in FY 2006. In addition, graduate students participate in some LDRD projects, and the LDRD program provides a mechanism for scientists and engineers at the laboratories to keep themselves current in their fields.

The Department has concluded that the LDRD program helps to maintain the vitality of the laboratories that support the Department's missions and national needs (especially at the weapons laboratories). We have carefully reviewed the management and administrative procedures and funding levels at each of the relevant laboratories.

FY 2006 LDRD Report to Congress

1. Introduction

1.1 Background

Pursuant to Congressional intent, the DOE multi-program national laboratories and manufacturing plants, and the Nevada Test Site, operate research and development programs using a portion of their overall budgets for the purpose of investing in future capabilities. This document reports on these programs for FY 2006.

LDRD, the first of these programs, was implemented at the DOE multi-program national laboratories to formalize what had been a long-standing practice, authorized by legislation, to use a percentage of the laboratory's total budget for critical research and development efforts that the laboratory determined to be important, but were not directly supported by DOE.

Within the overall context of maintaining the vitality of the laboratories, the specific purpose of the LDRD program is to provide the DOE laboratories with the opportunity and flexibility to undertake overhead-funded research and development activities to:

- (1) pursue new and innovative scientific and technological ideas;
- (2) enhance the scientific and technological vitality of the institution;
- (3) manage strategic direction; and
- (4) develop and retain new workforce capabilities.

DOE policy provides guidance to ensure effective management and oversight of the LDRD program while supporting the laboratories' abilities to pursue innovative self-selected projects. The process is consistent with DOE's management philosophy for all research and development activities, and it includes annual planning and reporting documents as well as program and peer reviews.

1.2 Purpose of the Report

Formally, this report responds to the Conference Report (106-988) accompanying the Energy and Water Development Appropriations Act for FY 2001, which requested DOE's Chief Financial Officer "to develop and execute a financial accounting report of LDRD expenditures by laboratory and weapons production plant." It also responds to the Conference Report (107-258) accompanying the Energy and Water Development Appropriations Act for FY 2002, which called for the Secretary of Energy to include in the annual report to Congress for all LDRD activities an affirmation that all LDRD activities derived from funds of other agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriation acts that provided funds to those agencies. Such an affirmation is included in Appendix 1 of this report.

Further, this report addresses Section 3136(b) (1) of the National Defense Authorization Act for FY 1997 (Public Law 104-201), which requires submission each year of “a report on the funds expended during the preceding fiscal year on activities under [the LDRD Program]...to permit an assessment of the extent to which such activities support the national security mission of the Department of Energy.” As defined by the Department, its national security mission is clearly and comprehensively supported by LDRD activities.

This report addresses how the LDRD program is managed, what research and development activities the funding supports, and why the program is important to DOE and the laboratories. The multi-program national laboratories organize their respective programs according to their individual needs; however, the LDRD program does have a common administrative approach to Congressional and Departmental guidelines.

This report describes the LDRD program and its implementation at the various DOE multi-program national laboratories. Newer, analogous programs implemented at the Nevada Test Site and at the manufacturing plants are summarized in Sections 3.1 and 3.2 of this report. They are authorized under separate legislation. The Plant Directed Research, Development and Demonstration (PDRD) Site-Programs are consistent with Congressional intent as stated in the Energy and Water Development Appropriations Act for FY 2001 (Section 310) and the Defense Authorization Act for FY 2001 (Section 3156) at the following sites:

- The Kansas City Plant, Kansas City, Missouri;
- The Y-12 Plant, Oak Ridge, Tennessee;
- The Pantex Plant, Amarillo, Texas; and
- The Savannah River Plant, Aiken, South Carolina.

The Site Directed Research, Development and Demonstration (SDRD) program is consistent with Congressional intent as stated in Section 310 of Energy and Water Development Appropriations Act for FY 2002 (H.R. 2311) which authorizes a program for directed research and development at the Nevada Test Site (NTS).

The FY 2006 Energy and Water Development Appropriations Act, Public Law 109-103, Section 311, raises the maximum LDRD funding level to 8 percent and the PDRD and SDRD funding level to 3 percent and makes all the DOE labs eligible for LDRD funding. It also applies overhead costs to LDRD, PDRD, and SDRD.

In FY 2006, the Savannah River National Laboratory (SRNL) initiated an LDRD program based on this legislation. The SRNL program started late in the fiscal year and very little LDRD work was actually performed in FY 2006, so the SRNL LDRD program will be included in this report starting in FY 2007.

2. FY 2006 LDRD Program

2.1 Financial Information

2.1.1 LDRD Funding Mechanism

The LDRD program is structured to pursue innovative and creative science and technology, often with an emphasis on projects that will contribute to the needs of multiple programs and Federal agencies. The Department views LDRD as a legitimate cost of doing business for all sponsors at the multi-program laboratories. Therefore, to ensure that all users of the laboratories support their fair share of LDRD, the costs are funded as part of laboratory indirect costs, up to a maximum of 8 percent of operating and capital equipment costs, and are treated as normal costs of doing business. As such, all organizations that fund programs at multi-program laboratories also fund LDRD activities. The capabilities developed and maintained through LDRD, in turn, may benefit all laboratory customers. This combination of equitable treatment of laboratory sponsors and multiple benefits derived from LDRD is achievable through the indirect cost funding mechanism for LDRD.

The pricing policy of DOE is full cost, which includes all direct costs incurred in performing the work, any other allocable costs incurred by the laboratory in performing the work, and a Federal administrative charge of 3 percent, as appropriate, of these costs for non-DOE sponsors. LDRD charges and assessments on Work for Others (WFO) agreements are discussed in more detail in Section 2.3. LDRD is considered an allocable cost in accordance with the terms of the laboratory operating contract and is identified in the laboratory's accounting system. As stated above, LDRD charges are currently treated as indirect costs of doing business at the laboratories. As such, they are allocated and reported in the cost of a laboratory's programmatic work (for both DOE programs and Work for Others).

2.1.2 FY 2006 Expenditures

For FY 2006 the multi-program national laboratories devoted approximately \$476 million to LDRD. The following table shows the LDRD costs by site for FY 2006. For more details on the individual projects conducted at each site, see Note 1. Note 1 provides a project listing by site including project identifier, project name and total FY 2006 project costs and is available at <http://www.mbe.doe.gov/cf1-2/lldr.htm>. It should be noted that the following table includes all LDRD costs including individual project costs listed in Note 1 and any administrative costs not specifically assigned to individual FY 2006 projects, if applicable.

Table I. Reported FY 2006 overall laboratory costs and LDRD costs at participating DOE laboratories.

Laboratory	LDRD Costs (\$M)	Total Laboratory Costs (\$M)	LDRD Fraction	Laboratory WFO Costs (\$M)
Argonne National Lab	22.9	495.9	4.62%	126.5
Brookhaven National Lab	11.1	420.0	2.64%	75.8
Idaho National Lab	21.1	685.7	3.08%	305.9
Los Alamos National Lab	125.4	2,022.0	6.20%	254.1
Lawrence Berkeley National Lab	18.6	485.6	3.84%	119.8
Lawrence Livermore National Lab	93.9	1,418.9	6.61%	329.7
Oak Ridge National Lab	24.2	879.3	2.75%	228.2
Pacific Northwest National Lab	27.6	660.2	4.17%	243.7
Sandia National Lab	131.7	2077.2	6.34%	764.9

2.1.3 FY 2006 LDRD Allocation Percentages

Departmental policy states that the maximum funding level established for LDRD must not exceed 8 percent of the laboratory’s total operating and capital equipment budgets, including non-DOE funded work, for the year. It is important to note that individual LDRD program estimates at each site are approved based on laboratory estimated budgets for the fiscal year. Initial planning bases are derived from funds anticipated. The final percentage calculation is based on actual LDRD costs and actual operating and capital equipment costs. Table I above includes the FY 2006 end-of-year information. It is important to note that “laboratory costs” are not the amount of laboratory program funding, but rather what was accumulated as costs. Also shown is the cost of work performed on behalf of other Federal agencies and non-Federal customers’ WFO programs. LDRD charges and assessments on WFO agreements are discussed in more detail in Section 2.3.

In addition, an analysis of the FY 2006 LDRD program was conducted as it relates to funding received from both defense and non-defense sources (including DOE and WFO sponsors) and the return on the dollars invested by those sources in the LDRD program. This analysis also includes data related to the DHS.

The total FY 2006 funding for the LDRD program conducted at the laboratories was approximately \$476 million, which represents about 5 percent of total laboratory costs at these laboratories. Of this amount, \$333 million was provided by defense customers, \$121 million by non-defense customers, and \$22 million by DHS. A review of the LDRD program funding shows that about \$348 million supports projects that will be expected to benefit the defense and national security missions, \$407 million supports projects that will be expected to benefit non-defense customer mission areas, and \$173 million supports projects that will be expected to benefit DHS programs.

In assessing the return on the dollars invested in LDRD, it is essential to understand that the vast majority of research and development activities have application to national needs in defense, non-defense and DHS arenas. That is, as the numbers above indicate, many of the LDRD projects are put in more than one category since they support fundamental research and can be expected to benefit defense, non-defense and DHS missions. The clear implication is that the anticipated benefit of LDRD science and technology to defense, non-defense and DHS national needs will always exceed the relative contribution of funds from these sources independently. This leveraging of the research capabilities of the DOE's multi-program laboratories is one of the features of the LDRD program and its focus on the long-term vitality of the laboratories.

2.2 Workforce Development

Maintaining the vitality of the DOE multi-program national laboratories—the overarching theme of the LDRD program—implies a responsibility not only for future-looking research and development but also for the workforce of the future. For the laboratories to be poised to tackle problems confronting DOE and the Nation they require more than facilities and infrastructure. Scientists and engineers must also be available to implement the capabilities of the laboratories.

Post-doctoral appointments offer the single largest source of new scientific and engineering talent for the DOE laboratories and are therefore deemed to be critical to maintaining institutional vitality. The LDRD program plays a central role in the various post-doctoral programs at all of the laboratories, as shown in Table II, but especially at the weapons laboratories.

Table II. Post-Docs supported by LDRD at the DOE Laboratories in FY 2006.

Laboratory	Total Post-Docs	Post-Docs Supported by LDRD	LDRD-Supported Fraction
Argonne National Lab	235	43	18%
Brookhaven National Lab	156	46	30%
Idaho National Lab	12	10	83%
Los Alamos National Lab	514	305	59%
Lawrence Berkeley National Lab	305	70	23%
Lawrence Livermore National Lab	139	114	82%
Oak Ridge National Lab	200	61	31%
Pacific Northwest National Lab	142	42	30%
Sandia National Lab	165	86	52%

In addition to this formal participation in post-doctoral programs, the LDRD program also supports a wide range of activities that enhance the laboratories workforce development. These include support for both undergraduate and graduate students working on LDRD projects, reputation building by providing laboratory visibility in a wider range of publication venues than would be the case without the results of LDRD, technical staff retention associated with opportunities to retain and hone scientific skills via LDRD, and a range of university collaborations stimulated via LDRD projects.

2.3 LDRD and the Work for Others Program

One of the features of the DOE multi-program national laboratories is the application of science and technology to a broad range of national security and science missions through the DOE WFO program.

All WFO sponsors appear to benefit from the science and technology base augmented by LDRD. The Department views LDRD as a legitimate cost of doing business for all programs at the multi-program laboratories. Therefore, to ensure that all users of the laboratories support their fair share of LDRD innovations, the cost is included as an allocable cost.

WFO programs are possible because the laboratories have developed research and development capabilities in a wide range of areas of relevance to organizations other than DOE. WFO customers seek out these capabilities and, in many cases, initiate WFO research and development at the laboratories. WFO research broadens the base of innovation at the DOE laboratories and increases the number of potential solutions to national challenges, including threats to national security. The laboratories' research results are enhanced by the cross-pollination of technologies developed in conjunction with its WFO partners.

In this regard, Congress provided language in the Conference Report accompanying the FY 2002 Energy and Water Development Appropriations Act that called for the Department to notify other Federal agencies that a portion of the funds collected through the WFO program will be used to fund LDRD projects. In addition, with the creation of the DHS, Congress enacted analogous requirements that LDRD funding associated with DHS programs be used to support DHS missions. As noted earlier, the Conference Report also called for the Secretary to affirm that all LDRD activities derived from funds of other agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts that provided funds to those agencies.

In response to the FY 2002 Conference Report, the Secretary issued guidance requiring all LDRD laboratories to notify other Federal agencies concerning LDRD charges. These procedures changed the WFO process to ensure proper notification of other Federal agencies as to the LDRD charges prior to funding work at the laboratory. Specifically, each new and/or revised WFO proposal provided to a Federal agency must indicate the amount of LDRD charges that will be collected. Furthermore, the proposal notifies the sponsor that, by providing funding, the agency is acknowledging that LDRD activities are beneficial to their organization and consistent with appropriation acts providing funds to that agency. Subsequently, each WFO funding acceptance document also includes the LDRD estimate acknowledgement.

In February of 2003, the Secretary of Energy and the Secretary of Homeland Security entered into a Memorandum of Agreement to implement key provisions of the Homeland Security Act. In addition, the Deputy Secretary of Energy issued a DOE Notice on *Reimbursable Work for the Department of Homeland Security*. The purpose of that document was to provide information on the process by which the DHS may place orders for reimbursable work activities to be performed at the DOE laboratories. Within that Notice, there are provisions for the notification of LDRD charges in the cost proposal as well as requirements for acknowledgements regarding the benefits of LDRD prior to final approval. On August 17, 2006, the Secretary of Energy issued DOE Order 484.1 to update the DOE Notice.

These policies have been implemented and provide a basis for the Secretary to affirm that the LDRD program is managed in accordance with the Congressional requests cited above. The Secretarial affirmation is included as Appendix 1. In December of 2003, the DOE Acting Chief Financial Officer transmitted applicable guidance and policy to reiterate the process to other Federal agency Chief Financial Officers who are customers and sponsors of work at the Department's laboratories.

3. FY 2006 PDRD and SDRD Programs

3.1 Plant Directed Research and Development

Fiscal Year 2006 PDRD Expenditures

The following table shows FY 2006 PDRD expenditures by site. It should be noted that the table includes all PDRD costs including individual project costs listed in Note 1 and any administrative costs not specifically assigned to individual FY 2006 projects, if applicable.

Plant	NNSA/DP Funding (\$M)	PDRD Costs (\$M)	PDRD Fraction*
Kansas City Plant	347.7	3.4	.98%
Pantex	625.9	1.8	.28%
Savannah River	141.5	.6	.40%
Y-12	644.1	14.5	2.26%

*Numbers may not compute due to rounding.

3.2 Site Directed Research and Development

Fiscal Year 2006 SDRD Program Expenditures

The following table shows FY 2006 SDRD program expenditures. It should be noted that the table includes all SDRD costs including individual project costs and any administrative costs not specifically assigned to individual FY 2006 projects.

Site	NNSA Funding (\$M)	SDRD Costs (\$M)	SDRD Fraction*
Nevada Test Site	267.9	6.0	2.24%

* Numbers may not compute due to rounding.

4. Report Conclusions

The DOE LDRD program offers a flexible mechanism by which the multi-program national laboratories maintain their vitality and, in the process, prepare themselves to help address the Nation's future scientific and engineering challenges. In FY 2006, the multi-program national laboratories devoted approximately \$476 million to LDRD, funding projects ranging in size from less than \$5,000 per year to over \$3 million. LDRD projects address topics that span the entire range of DOE's mission areas.

In addition, the production plants invested approximately \$20 million through the Plant Directed Research and Development (PDRD) program to fund projects that emphasized science and technology with the potential to enhance the plants' mission-related manufacturing capabilities, operations, and core technical competencies and the Nevada Test Site invested approximately \$6 million through the Site Directed Research and Development (SDRD) Program.

An analysis of LDRD investments compared to the sources of laboratory funding indicates the LDRD benefits are commensurate with the funding received from defense, non-defense and DHS sources. The Department also affirms that all FY 2006 LDRD activities derived from funds of other Federal agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts providing funds to those agencies.

An important component of the contribution of the program to the laboratories' future is their ability to attract promising young scientists and engineers to the institutions. LDRD funded post-doctoral appointments, for example, supported about 41 percent of all post-doctoral scientists and engineers at the multi-program national laboratories in FY 2006. In addition, many graduate students participate in LDRD projects, and the programs provide a mechanism for scientists and engineers at the laboratories to keep themselves current in their fields.

The flexibility inherent in the LDRD program is essential to maintaining the vitality of the laboratories that carry out the Department's missions and national needs. We have carefully reviewed the management and administrative procedures governing the program and monitor LDRD funding levels at each of the laboratories. This oversight is integral to maintaining a strong, credible and effective LDRD program.

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2004-026	Science and Technology of a New TiAlO[x] Alloy Oxide and Its Application to a New Generation of Integrated Circuit Gate Dielectric	\$109900
P/ANL2004-038	Time-Resolved Studies of Magnetization Dynamics in Nanostructured Materials	\$137900
P/ANL2004-044	Palladium/Semiconductor Nanohybrids as Hydrogen Sensors for Fuel Cell Applications	\$156600
P/ANL2004-057	Novel Integrated (On-Chip) Magnetic Field Sensors	\$120800
P/ANL2004-063	Ferromagnetic Micro-Disks with Superior Properties for Biomedical Applications	\$131900
P/ANL2004-095	Nanoporous Separation Membranes	\$169900
P/ANL2004-115	Photosynthetic Reaction Center as a Novel Quantum Electronic Circuit Element	\$196400
P/ANL2004-126	Novel Hydrogen Storage Media through Nano-Structured Polymer and Carbon Layer Materials	\$158400
P/ANL2004-133	Ultra-High-Sensitive Miniature Calorimeter for Studies of Confinement Effects of Bio-Organic Structures	\$97200
P/ANL2004-141	Environment for a Nanoscale Materials Virtual Fab Lab	\$361900
P/ANL2004-142	Simulations of Spin Wave Excitations in Magnetic Nanoparticles	\$82100
P/ANL2004-144	Near-Field Optical Investigations of Nanoscale Photochemistry and Photophysics	\$173500
P/ANL2004-148	Discovery of Protein Space	\$97400
P/ANL2004-157	High-Throughput Analysis of Low Abundance Protein Constituents in Complex Biological Mixtures	\$452100
P/ANL2004-159	Molecular Recognition: Protein-Small Molecule Interactions	\$82500
P/ANL2004-162	The Biogeochemical Cycle of Nitrogen: Effects on Climate Change	\$224800
P/ANL2004-191	Multidimensional Flow and Heat Transport Natural Convection Test Capability	\$181800
P/ANL2004-212	Superhard Coatings for Wear Reduction and Energy Saving Applications in Diesel Engines	\$158300
P/ANL2004-213	Pressure Rate Controlled Compression Ignition (PRCCI)*	\$121400
P/ANL2004-215	Investigation into Nano-Particulate Production from Homogeneous Charge Compression Ignition (HCCI) Combustion	\$122200
P/ANL2004-226	Development of Ultrafast Laser Techniques for Advanced Accelerator Research	\$158200
P/ANL2004-227	Advanced Heavy-Ion Beam Dynamics	\$92000

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2004-228	Next-Generation Light-Source Storage Ring Design and Simulation	\$85500
P/ANL2004-232	Improvement of FNAL Run II Performance: Optical Transition Radiation (OTR) Imaging for Protons and Antiprotons	\$24100
P/ANL2004-242	Laser Surface Texturing for Friction Reduction	\$97400
P/ANL2004-243	Innovations for Small Modular Fast Reactor	\$363800
P/ANL2005-007	Motion of Nanoparticles in Nanofluids	\$104600
P/ANL2005-024	ALD Stabilization of Nanoparticles Designed on the Atomic Scale	\$154400
P/ANL2005-028	Fundamental and Applied Science of Hybrid Ferroelectric/Piezoelectric-Diamond Heterostructures for High-Performance MEMS/NEMS Devices	\$143300
P/ANL2005-032	Uniform-Sized Biodegradable Nanospheres for Drug Delivery - Novel Synthesis Platform Can Revolutionize Targeted Drug Delivery	\$93800
P/ANL2005-036	Investigating Ultra-Fast Catalysis and Electro-Catalysis Processes using Time-Resolved X-Ray Absorption Techniques	\$150600
P/ANL2005-046	Nanosensors for Label-Free Detection of Protein-Ligand Binding at Biological Membrane Surfaces	\$190500
P/ANL2005-065	Shock-Wave Desorption of Large Organic Molecules	\$125200
P/ANL2005-067	Nano-Ionics: A Route to High Performance Fuel Cells, Membranes, and Sensors	\$182200
P/ANL2005-086	Imaging Microbial Biofilms using Mass Spectrometry	\$125600
P/ANL2005-089	Organic Light-Emitting Diodes Based on Nanostructured Non-Sandwich Electrodes	\$146800
P/ANL2005-092	Enhancement of Battery and Ultracapacitor Performance through Novel Applications of Nanotechnology	\$144700
P/ANL2005-127	Collectivity in Inorganic and Bio-Inspired Optical Nanosystems	\$177000
P/ANL2005-140	Reducing Heavy Duty Vehicle Emissions through Coupling Diesel Reforming to Emissions Catalysts and Engine Control Devices	\$108700
P/ANL2005-147	Manipulation of Biomolecules using Metal Oxide Nanoparticles (Formerly "Hybrid Nanostructures within Cell Machinery")	\$123200
P/ANL2005-150	Metalloproteomics and Metalloregulation of Signaling	\$248700
P/ANL2005-155	In Situ X-Ray, Electrochemical, and Modeling Investigation of High-Temperature Fuel Cell and Electrolysis Electrodes	\$220100
P/ANL2005-157	High-Fidelity Integrated Simulation of Nuclear Energy Systems through Petascale Computing	\$62600

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2005-160	Planning for a New Neutrino Experiment at a Nuclear Reactor	\$116700
P/ANL2005-161	Femtosecond Pulses of Coherent Synchrotron Radiation from an Emittance-Sliced X-Ray FEL	\$30500
P/ANL2005-166	Aligned Molecular Targets for Fourth Generation Sources	\$98500
P/ANL2005-168	Lateral and Molecular Spintronic Structures	\$151800
P/ANL2005-179	Fast Release ISOL Target Concept Based on Aerogels	\$23000
P/ANL2005-187	Integrated Simulation Framework for National Security Decision Support	\$271400
P/ANL2005-193	PDQuest: Investigations into Applications, Software and Architectures for Enabling Petascale Science	\$877900
P/ANL2005-194	Computation and Informatics for Modeling and Analysis of Biological Systems	\$69100
P/ANL2005-204	Universal Phylochip for Environmental Background Characterization and Monitoring	\$235100
P/ANL2005-210	Nanoscale Materials Synthesis and Self-Assembly	\$170300
P/ANL2005-213	Novel Magnetic Force Microscopy for Variable-Temperature Ultra-High-Vacuum Environments	\$86000
P/ANL2005-214	A Hybrid Instrument - MISANS (Modulated Intensity Small-Angle Scattering)	\$60000
P/ANL2005-215	High-Resolution Element-Selective Microscopy Using X-ray Enhanced Scanning Tunneling Microscopy	\$108800
P/ANL2005-216	Quantum Critical Behavior in Nanostructured Materials	\$133400
P/ANL2005-217	Precision Measurement of Hadronic Showers	\$179300
P/ANL2005-221	Advancing Multidisciplinary Condensed Matter Theory	\$122400
P/ANL2005-223	In-Situ Raman Spectroscopy of Catalysts	\$450800
P/ANL2006-015	Development of a New Concept for a Solenoid Spectrometer for Nuclear Structure Studies	\$155700
P/ANL2006-023	Ultra-Fast Phase-Enhanced X-Ray Imaging with Micrometer-Spatial and 150 Picosecond Temporal Resolutions	\$174600
P/ANL2006-033	Quantum Wire Interconnects	\$136500
P/ANL2006-035	Biocompatibility of Ultra-Nanocrystalline Diamond Thin Films	\$145900
P/ANL2006-075	Large-Area Detectors with Pico-Second Time Resolution	\$106800
P/ANL2006-088	Time-Resolved Optical Sensors for Biological Molecules with Ultra-High Sensitivity and Specificity	\$127100
P/ANL2006-091	Adopting Photonic Concepts to THz Generation	\$145000

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2006-096	Nanoscale Engineered Superconducting RF Cavities as Novel Accelerating Elements	\$169400
P/ANL2006-105	Uncharacterized Gene with Putative Function in Bone	\$171800
P/ANL2006-118	Plasmon Scanner for High-Resolution Surface-Enhanced Raman Spectroscopy of Biological Nanosamples	\$147100
P/ANL2006-123	International Linear Collider R&D at Argonne: The Gamma-Ray Based Positron Source and Positron Emulator Study	\$198900
P/ANL2006-126	Institutional Factors Analysis Tool for Energy Projects	\$17900
P/ANL2006-127	Characterization of the Transportation Sector for Input to the ENPEP Model	\$24400
P/ANL2006-128	Stationary Energy Demand: Characterization of Industrial, Residential, and Commercial Energy	\$17800
P/ANL2006-129	Technology Assessment Financial Analysis Tool	\$23900
P/ANL2006-132	Develop Electric Sector Characterization	\$17800
P/ANL2006-134	Enhanced Energy and Emissions Analysis Linkage of GREET and ENPEP Models	\$36300
P/ANL2006-136	Development of an Integrated Site-Specific Environmental Assessment Tool	\$30100
P/ANL2006-137	Plug-In Hybrid Electric (P-HEV) Vehicle Optimization	\$193200
P/ANL2006-139	Development of Cost Engineering and Technology Verification Tools	\$23800
P/ANL2006-141	Renewable Bio-Fuel Combustion Characteristics in Automotive-Type Diesel Engines	\$71600
P/ANL2006-145	Methodology and Model for Evaluating Advanced Energy and Environmental Technology R&D Options Considering Multiple Criteria and Multiple Perspectives under Conditions of Uncertainty	\$30500
P/ANL2006-146	Advanced Beam Diagnostics Development and RF Photocathode Studies for Low Emittance Electron Beams: A International Linear Collider Study	\$45100
P/ANL2006-147	Natural Gas Sector Characterization	\$17800
P/ANL2006-148	Developing a Conventional Analysis Framework	\$71900
P/ANL2006-149	Novel Nano-Architectures for High-Efficiency Solar Cells	\$146800
P/ANL2006-150	Design and Develop an Advanced Analysis Framework	\$59600
P/ANL2006-151	Fungible Fuels by Bioprocessing	\$331900
P/ANL2006-152	Conversion of Solid Carbon Feedstocks into Liquid Hydrocarbons for Transportation Fuels through Gasification	\$450300

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2006-154	A Photoelectrochemical Cell for Integrated Production and Separation of High-Purity Hydrogen	\$157700
P/ANL2006-156	Petroleum Sector Characterization	\$23900
P/ANL2006-162	Toward Peak Performance on Petascale Machines for Nonlinear PDE Simulations	\$75500
P/ANL2006-165	On-Vehicle Reforming of Ethanol/Water for Hydrogen-Fueled Vehicles and Auxiliary Power Units	\$190000
P/ANL2006-166	Development of Nuclear Energy Sector Characterization	\$16600
P/ANL2006-168	Interparticle Coupling and High Frequency Dynamic Response in Magnetic Nanocrystal Colloids and Assemblies	\$220100
P/ANL2006-169	Nanophotonics Materials and Devices	\$126000
P/ANL2006-170	Functionalization of Polarizable Surfaces for Nanofluidic Control	\$131400
P/ANL2006-171	Biomolecule Directed Assembly of Nanostructures	\$253100
P/ANL2006-180	Development and Spray Characterization of Micro-Orifice Diesel Injector Nozzles Fabricated using Electroless Nickel Coating	\$65700
P/ANL2006-181	Prototype Design of a Low-Level RF Control System Utilizaing Software Defined Radio and Digital Signal Processing Techniques and Hardware	\$41800
P/ANL2006-183	Development and Demonstration of a Prototype Omnivorous Engine	\$178500
P/ANL2006-184	Superconducting Quantum Dot Solids	\$123500
P/ANL2006-185	R&D of Control System Requirements for Future Accelerators	\$60800
P/ANL2006-188	Development of Transition Radiation and Diffraction Radiation Diagnostics for GeV Electron Beams	\$24900
P/ANL2006-190	Investigations of Coherent Synchrotron Radiation Effects on Bunch-Compressed Bright Electron Beams	\$49900
P/ANL2006-191	Technical Assessment of the ILC Damping Rings	\$34200
P/ANL2006-198	Liquid Metal Simulations for Fusion, Accelerator, and Astrophysical Applications	\$143500
P/ANL2006-199	Theoretical Investigations of Atomic and Molecular Interactions with Ultrafast/Ultraintense X-Ray Radiation	\$330300
P/ANL2006-201	Surface Discharge for ILC Fast Kicker	\$15300
P/ANL2006-205	Advanced Simulation of Nuclear Fuel Cycle	\$825600
P/ANL2006-209	Laser Spark Assisted HCCI	\$60900
P/ANL2006-210	Developing International Energy Market Characterizations	\$17800

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2006-211	Develop Renewable Energy Sector Characterization (Wind Energy, Bioenergy, and Solar Energy)	\$18300
P/ANL2006-212	Developing A Minimal-Organism Platform for Systems Biology	\$738900
P/ANL2006-213	Energy Conversion at Bio-Hybrid Interfaces	\$333000
P/ANL2006-214	Characterization of the Candidate Damping Ring Designs of the International Linear Collider	\$52300
P/ANL2006-216	Advanced Electron Accelerator Simulation	\$296900
P/ANL2006-219	Large Solid Angle Multielement Fluorescence Detector	\$62500
P/ANL2006-220	Condensed Matter Theory: Nanoscale Superconductivity and Magnetism Studies	\$221100
P/ANL2006-223	Secure Database Access Technologies for Large-Scale Data Management	\$152600
P/ANL2006-224	Development of High Intensity/Thermal Energy Positron Source Utilizing the Chemistry Division 20 MeV Electron Linac	\$64800
P/ANL2006-225	Ultimate Limit for Hard X-Ray Focusing	\$237000
P/ANL2006-226	Nanomagnetics	\$92400
P/ANL2006-227	Towards A Model-Driven Accelerator	\$161800
P/ANL2006-228	Gas Cell Development	\$137300
P/ANL2006-232	Demonstration of a Full Power Mass 238, 1+ RFQ for a Radioactive Beam Post-Accelerator	\$128200
P/ANL2006-233	Demonstrate a Heavy Ion Driver Front End	\$225900
P/ANL2006-234	Phase Control of High-Gradient Superconducting Spoke-Loaded Cavities	\$215800
P/ANL2006-235	Develop Electropolishing Techniques for 1.3 GHz 9-Cell Elliptical-Cell Superconducting Cavities	\$201900
P/ANL2006-236	Development of Diagnostics for Lithium Thin Film Strippers	\$107600
P/ANL2006-237	Ultrashort X-Ray Pulse Generation	\$138700
P/ANL2006-238	Development of a Rad-Hard, High-Speed, Rotary Vacuum Feed-Through Drive	\$39300
P/ANL2006-240	Biomimetic Nanostructures for Efficient Solar to Electrical Energy Conversion	\$105100
P/ANL2006-243	Parallel Computation for Laser Plasma Interactions at Relativistic Intensities	\$101300
P/ANL2006-245	High Throughput Nano-Array for Comprehensive Protein Characterization	\$267000
P/ANL2006-246	Single-Molecule Interrogation of Photosynthetic Nano-Architectures	\$160300
P/ANL2006-248	Beam Physics Topics for Compact Accelerators	\$170200

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2006-249	A Novel Hybrid Detection System for National Security to Counter Seaborne Container Terrorism	\$179200
P/ANL2006-251	Molecular-Scale and Nano-Scale Theoretical Chemistry Studies	\$229700
P/ANL2006-254	Photoacoustic Techniques for Remote Sensing of Explosives	\$220300
P/ANL2006-256	Coal Sector Characterization	\$29900
P/ANL2006-257	Nanoscale Studies of Metal/Oxide/Metal Tunnel Junction Structures: Development of Novel Characterization Tools	\$182500
P/ANL2006-258	Nanoscience Theory	\$112900
P/ANL2006-259	High Field Surface Studies	\$37300
P/ANL2006-260	Advancing Nuclear Theory for a Rare Isotope Accelerator: Nuclear Structure and Reactions by Astrophysics	\$124000
P/ANL2006-262	Nuclear Theory for Supernovas	\$187300
P/ANL2006-263	Synthesis, Characterization, and Electrocatalytic Activity of Bimetallic Nanoclusters	\$184800
P/ANL2006-264	Development and Applications of Theoretical and Computational Approaches for Biomolecular Systems	\$352900
P/ANL2006-265	Development of a High Resolution Accelerator Alignment Technique using X-Ray Optics	\$31900
P/ANL2006-266	Undulator for the ILC Positron Source	\$33400
P/ANL2006-267	Beam Dynamics in High-Brightness Photoinjectors	\$115300
P/ANL2006-268	Novel Hybrid Nanomaterials via Uniting Top-Down and Bottom-Up Assembly Methods	\$84800
Total # of Projects for ANL:	152	Total Cost for ANL: \$22837900

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

BNL - Brookhaven National Lab

Project ID	Project Name	FY Total
03-104	Hydrogen Atom Transfer from Carbon to Metal - Relevance of a Novel Reaction to Catalyzed Hydrocarbon Conversions	\$32516
04-011	Femtosecond Photoinitiated Nanoparticle Surface Chemistry	\$54737
04-013	Chirped Pulse Amplification at the DUV-FEL	\$54633
04-025	Overcoming Coherent Instabilities at Medium-Energy Storage Rings	\$53795
04-033	Layered Cobaltates with High Thermoelectric Power	\$25616
04-038	Complex Thin Films and Nanomaterial Properties	\$370772
04-041	Physics of Quark Gluon Plasma (QGP)	\$48156
04-043	Very Long Baseline Neutrino Oscillation Experiment	\$46012
04-046	Advanced ³ He Detectors for the Spallation Neutron Source	\$50173
04-055	Genetic NanoTags	\$135077
04-060	The Use of Singular Point Genome Sequence Tags to Analyze Community Composition and Metabolic Potential	\$77544
04-061	3-D Electronic Wave Functions from EM Images	\$67144
04-062	Functional MRI Studies in Rats using Implanted Brain Electrodes	\$56135
04-063	Optimizing Functional Neuroimaging Techniques to Study Brain Function in Health and Disease States	\$69277
04-066	Technological Development of a Fluorescence Probe for Optical Detection of Brain Functional Activation in vivo	\$121180
04-069	Nuclear Control Room Unfiltered Air In-Leakage by Atmospheric Tracer Depletion (ATD)	\$41167
04-073	Perfluorocarbon Tracer Sampling, Tagging and Monitoring Techniques for use at the Urban Atmospheric Observatory	\$45056
04-079	Development of an Aerosol Mobility Size Spectrometer and an Aerosol Hygroscopicity Spectrometer	\$53471
04-086	Exploration of Thermal Diffusion Processes in CdZnTe for Improved Nuclear Radiation Detectors	\$60502
04-088	An Integrated Approach of High Power Target concept Validation for Accelerator-Driven Systems	\$53954
04-104	Hydrogen Storage Using Complex Metal Hydrides for Fuel Cell Vehicles	\$36891
05-003	Full Power Test of the Amplifier for the Optical Stochastic Cooling using JLAB FEL	\$160571
05-005	Study of Photon Coupling to an Electromagnetic Field Gradient	\$175406

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

BNL - Brookhaven National Lab

Project ID	Project Name	FY Total
05-006	Heavy Ion Physics with the ATLAS Detector	\$124143
05-017	Superconducting Lead Photoinjector	\$156480
05-020	Controlled Formation of Nanostructured RuO ₂ Catalysts	\$148357
05-021	Hydrogen Storage in Complex Metal Hydrides	\$167271
05-028	Behavior of Water on Chemically Modified Semiconductor Surfaces: Toward Photochemical Hydrogen Production	\$159760
05-030	Assembling of Biological and Hybrid Complexes on Surfaces	\$188818
05-033	Ultra High Resolution Photoelectron Spectrometer	\$81592
05-038	Metal-Metal Oxide Electrocatalysts for Oxygen Reduction	\$137025
05-041	Multifunctional Nanomaterials for Biology	\$145480
05-042	Polariton-Enhanced FRET for Device-Integration of Plasma Membranes from Rhodobacter Sphaeroides	\$103218
05-044	Intense THz Source & Application to Magnetization Dynamics	\$131904
05-048	Nano-Imaging of Whole Cells with Hard X-Ray Microscopy	\$91159
05-050	Study to Convert NSLS VUV Ring to Coherent IR Source	\$16600
05-051	Superconducting Undulator Technology	\$228264
05-057	Characterization and Imaging of Amyloid Plaques Using Diffraction Enhanced Imaging	\$131955
05-058	Development of Methodologies for Analyzing Transcription Factor Binding in Whole Genomes	\$143704
05-063	Application of Endophytic Bacteria to Improve the Phytoremediation of TCE and BTEX using Hybrid Poplar	\$281627
05-064	Design and Build Two Dimensional Protein-Lipid Thin Film: A First Step Toward Novel Biochips	\$76898
05-068	Positron Labeled Stem Cells for Non-Invasive PET Imaging Studies of In-Vivo Trafficking and Biodistribution	\$140374
05-069	Breaking the Millimeter Resolution Barrier in fMRI	\$146891
05-070	Novel Multi-Modality MRI and Transcranial Magnetic Stimulation to Study Brain Connectivity	\$145397
05-071	Ovarian Hormone Modulation of ICP: MRI Studies	\$144973
05-072	Feasibility of CZT for Next-Generation PET Performance	\$135784
05-074	Biology on Massively Parallel Computers	\$222345

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

BNL - Brookhaven National Lab

Project ID	Project Name	FY Total
05-078	Ionic Liquids in Biocatalysis and Environmental Persistence	\$120049
05-082	Single Particle Laser Ablation Time-of-Flight Mass Spectrometer (SPLAT-MS) Enhancements: Aerosol Optical Properties and Increased Particle Detectivity	\$132696
05-088	Transition Metals in Oil and Gas Exploration	\$163631
05-092	An Innovative Infiltrated Kernel Nuclear Fuel (IKNF) for High-Efficiency Hydrogen Production with Nuclear Power Plants	\$172648
05-094	Development of Green Processes: Catalytic Hydrogenation in Water Utilizing In Situ Biologically-Produced Hydrogen	\$358800
05-098	Fast Neutron Imaging Detector	\$190989
05-104	Giant Proximity Effect in High-Temperature Superconductors	\$366753
05-105	Development of an Observation-based Photochemical-Aerosol Modeling System	\$106242
05-110	Computational Science	\$87284
05-114	Study of High-Tc Nanostructures	\$367090
06-001	Lattice Studies of QCD Thermodynamics on the QCDOC	\$158792
06-004	Detector Development for Very Long Baseline Neutrino Exp.	\$66230
06-012	Detector for High Quality Images of Electron Microscopy	\$70180
06-017	Transmission Photocathode Development	\$67470
06-021	Synthesis and Characterization of Band-Gap-Narrowed TiO ₂ Thin Films and Nanoparticles for Solar Energy Conversion	\$69484
06-026	Multiscale Analysis of In Vivo Nanoparticle Exposure	\$192178
06-030	Development of Gadolinium-Loaded Liquid-Scintillators with Long-Term Chemical Stability for a New High-Precision Measurement of the Neutrino Mixing Angle, Theta-13	\$199946
06-037	Electronic Properties of Carbon Nanotubes and Novel Multicomponent Nanomaterials	\$45590
06-038	Growth and Characterization of CdZnTe Crystals for Improved Nuclear Radiation Detectors	\$62932
06-039	Design, Synthesis and Characterization of a New Class of Hydrocarbon Polymers Containing Zwitter Ions and Nanostructured Composites for High Temperature Membrane in PEM Fuel Cells	\$133331
06-044	New High-Resolution X-Ray Monochromators for Condensed-Matter Science Experiments	\$1871
06-046	Novel Materials for Hard X-Ray Optics	\$24809

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

BNL - Brookhaven National Lab

Project ID	Project Name	FY Total
06-047	Nano-Crystallography of Individual Nanotubes and Nanoparticles	\$62673
06-052	High-Temperature Superconducting Magnet Development	\$236846
06-056	Epigenetics: Methamphetamine (MAP)-Induced Brain Dysfunction and Methylation of DNA	\$76620
06-060	Molecular Mechanism of Chromosomal Replication Initiation in Eukaryotic System	\$101859
06-061	Diversification of Isoflavonoid Biosynthesis	\$437328
06-065	Metabolic Flux Analysis in Arabidopsis Thaliana	\$425511
06-066	Transformation and Fate of Nanomaterials in the Environment	\$140086
06-071	Development of a Cloud Condensation Nucleus Separator	\$69661
06-074	Aluminum Hydride - An Ideal Hydrogen Source for Small Fuel Cells	\$132601
06-087	Gamma Ray Imager for National Security Applications	\$110380
06-088	Neurogenomics: Collaboration Between the Biology Department and the Brookhaven Center for Translational Neuroimaging to Investigate Complex Disease States	\$149971
06-092	Nanoparticle Labeled Neural Stem Cell Tracking In Vivo by Magnetic Resonance Microscopy	\$109022
06-094	MicroCT Methods of Quantitative Adipose Imaging: Development of a Long-Term Assessment Technique for Studying Obesity in a Rodent Model	\$77143
06-095	Study of Overdoped HTS Materials	\$181219
06-096	HTS Trilayer Josephson Junctions	\$212075
06-097	Photocatalytic Reduction of CO2 in Supercritical CO2	\$80098
Total # of Projects for BNL:	85	Total Cost for BNL: \$11101892

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

INL - Idaho National Lab

Project ID	Project Name	FY Total
AE104	Development of Experimental Methods for Measurements of Nuclear Cross Sections	\$263037
AE105	Evaluation of Alternate Materials for Coated Particle Fuels for the Generation IV Gas-cooled Fast Reactor	\$508353
AE107	Investigation of Fundamental Thermal-Hydraulic Phenomena in Advanced Gas-Cooled Reactors	\$310110
AE108	Advanced Fuel Development	\$260608
AE109	Investigation of Nanofluids for use in Nuclear Reactors	\$399488
AE110	Design of a High-Resolution Reactor Analysis Capability Using a Generic Transport Algorithm	\$374580
AE111	Investigation of Core Flow Behavior During Loss of Coolant Transients for the Generation IV Gas Cooled Reactor Designs	\$275926
AE112	Reactor Physics Methods Development for Idaho National Laboratory Competitiveness in Next Generation Nuclear Plant (NGNP) Design	\$175722
AE113	Fuel Fabrication Development	\$283495
AE114	SESAME: Simulations Enabled Safeguards Assessment Methodology	\$382502
AE115	SINEMA: Simulation Institute for Nuclear Energy Modeling and Analyses	\$394618
AE116	Optimization of Electrorefining of Spent Nuclear Fuel Using Ultrasonic Electrode Agitation	\$180500
AF100	Laser Acoustic In-situ Monitoring of Nuclear Reactor Material Mechanical Properties	\$167066
AF101	Influence of Grain Boundary Character on Microstructure and Properties of High Temperature Alloys	\$110998
AS100	Fundamental Thermodynamics of Non-Ideal Systems for Advanced Radionuclide Separations	\$260725
AS101	Synthesis, Characterization and Testing of Dithiophosphinic Acid Derivatives	\$262102
CA101	Development of a multi-species Rhodospseudomonad H2 Producing Photosynthetic Anaerobic Microbial System.	\$28659
CA102	Synthesis and Characterization of Perovskite-Type Oxygen Permeable Membranes	\$27401
CA103	Determining Melting Behavior of Materials with Internal Heat Generation	\$19924
CS124	Cyber Protection for Critical Infrastructure	\$197746
CS127	Attack Graph Approach to Control System Vulnerability Analysis	\$325208
CS128	Next-Generation Neutron Generator	\$310757

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

INL - Idaho National Lab

Project ID	Project Name	FY Total
ET121	Human Factors for Management of High Consequence Events	\$91740
ET122	Developing the Scientific Basis for Landscape Level Management of Federal Facilities	\$222488
ET132	Modulating Drain Valve for Continuous Processing of High Temperature Molten Materials	\$163589
ET133	Systematic Feasibility Analysis of Power Production from Unconventional Geothermal Resources	\$85122
ET134	Investigation of Passive Film Performance on Hastelloy C22 in Structural Loading	\$183631
ET135	Dynamic Autonomy for Mobile Manipulation	\$351853
ET137	Development of Integrated Virtual Engineering Tools to Facilitate Unique High-Level Decision Making Capabilities	\$123487
FF100	The Metabolic Capabilities of Acidithiobacillus caldus, a Ubiquitous Moderately Thermophilic Acidophile	\$124058
FF101	Innovative Applications of Dissipative Particle Dynamics	\$97839
FF102	Ion Exchange Coatings for Analysis	\$135101
FF103	Hybrid Welding Process	\$129155
GB100	The Metabolomics of a Naturally Occurring Acidophilic Bacteria System	\$223397
GB101	Development of an Autonomous Geophysical System for Quantitative Monitoring of Redox Zonation and Subsurface Flow	\$163362
GC153	Development and Use of Transgenic Caenorhabditis elegans to Measure Bioavailability of Metals and Mutagenicity in Contaminated Media	\$206833
HT106	Renewable Biomass Carbon for Synthetic Fuels to Support the Hydrogen Economy	\$309189
HT107	H2O/CO2 Co-Electrolysis for Syngas Production	\$241903
HT108	Alternate Configurations for High Temperature Electrolysis Cells	\$295465
HT109	Hybrid Heterogeneous Catalysts for Hydrogenation of Carbon Dioxide to Liquid Hydrocarbons	\$195383
HT110	Technical and Economic Evaluation of Options for CO2 Use	\$257906
HT111	Fundamental Aspects of Membrane-Permeant Interactions	\$102414
HT112	Integrating Decision Making with Engineering Process Simulations for the Assessment of Converting Biomass CO2 and Nuclear H2 to Synthetic Liquid Transportation Fuels	\$338123
HT113	Module-Based Gasification and Synfuels Processes Simulator	\$440599

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

INL - Idaho National Lab

Project ID	Project Name	FY Total
HT114	Small Scale Ammonia Production System	\$83518
NE131	Bimodal Nuclear Thermal Propulsion	\$158301
NE139	Dynamic Probabilistic Extensions to the SAPHIRE Risk and Reliability Designer Tool	\$198104
NE141	Joint System Prognostics For Increased Efficiency And Risk Mitigation In Advanced Reactor Instrumentation And Control	\$459157
NE144	Design of a High-Resolution Multiphase Reactor Analysis Capability	\$332134
NE145	On-line Symbolic Condition Monitoring of Advanced Energy Systems	\$151264
NN100	Model-based Design and Evaluation of Advanced Safeguards and Proliferation Detection Systems	\$202767
NN102	Ultratrace Plutonium Analysis and Standard Preparation	\$77654
NN103	Realization of FTMS Potential for Accurate Measurement of Extreme Isotope Ratios	\$304356
NN104	Development of In-situ Measurement Technology for On-line Monitoring of Actinide Concentrations in Molten Salt Electrolyte	\$121822
NN105	Demonstration of a Proliferation Pathway in a Thorium Fuel Cycle Using Pyrochemical Processes	\$49908
NN106	Environmental Signatures in the Nuclear Fuel Cycle: Pathway Analysis of Signature Alteration in Environmental Samples	\$160322
NN107	Non-proliferation Issues as Related to Advanced Fuel Cycle and Advanced Fast Reactor Development with Processing of Reactor Fuel	\$370441
NN108	Development of a Bayesian Estimation Method for the Detection of Nuclear Proliferation	\$197536
NS144	Proactive Designs of Self-Configuring Dynamic Sensor Networks for Wide Area Persistent Monitoring	\$232767
NS145	Forensic Signatures of Higher Actinide Elements in Advanced Irradiated Fuels	\$248981
NS146	Biological Threat Agent Forensics	\$130496
NS147	Enhanced Explosives Testing Capability	\$747749
NS149	Radio Frequency Test Range Characterization	\$137510
NS150	Investigation into the Preservation and Enhancement of Mobile Ad-Hoc Network Quality of Service	\$286599
NS151	Sensor-Assisted Autonomous Precision Landings for Man-Portable UAVs	\$268063
RP104	Improved Techniques for In-Situ Measurements	\$329568

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

INL - Idaho National Lab

Project ID	Project Name	FY Total
RP105	NiCrFe Filler Metal for Cracking Resistance	\$203071
RP106	Protective coating Development for Reactor Instrumentation	\$238748
RP109	Analysis and Modernization of Radioanalytical Methods and Equipment used to Support ATR	\$165403
SC121	Effect of Environmental Variables on Bicarbonate Transport by Marine and Freshwater Cyanobacteria	\$287773
SC122	Synthesis and Characterization of Hybrid Materials for Advanced Membranes and Molecular Ropes	\$124419
SC133	Materials Damage Evolution and Failure	\$217489
SC134	In Situ Laser-based Characterization of Fatigue Damage in High Temperature Environments	\$195617
SC137	Microbial Metabolic Systems Approach to the Evaluation of Hydrogenic Activity of Extremophilic Anaerobic Carboxydotrophs	\$739556
SC138	Structure and Reactivity of Actinide Complexes and Clusters under Controlled Solvation Conditions	\$269925
SC139	Optical Eddy Current Techniques for Harsh Environments	\$163610
SC140	Multiple Sensor Array for Harsh Environments	\$145776
SH100	Microstructure and Deformation Physics of Fission-Reactor Model Materials by Atomistically Informed Mesoscale Simulation	\$393077
SM103	Establishment of a Comprehensive Armor Material, Process and Manufacturing Program at the INEEL/SMC	\$374942
ST114	Investigation of the Potential for 90Sr Immobilization in INTEC Perched Water via Microbially Facilitated Calcite Precipitation	\$101865
ST115	Experimental Investigations of Application and Delivery Mechanisms for In Situ Stabilization of Sr-90 in the Alluvium and Interbed Sediments Underlying the INTEC Tank Farm	\$390865
ST118	Novel Polymers For Use as Improved Biomedical Coatings	\$62942
ST119	Development of Rapid, Easy-To-Use Antibody-based Assay to Detect Asbestos	\$59534
ST120	Reduction of biomass sugar costs through the use of thermal and acid stable xylanases and reduced severity pretreatments	\$220393
ST121	Proof of Concept of an Autonomous Robotic Data Driven Sensing Platform	\$58404
TM100	Computational Modeling of Catalysts for the Reduction of Sulfur Trioxide in the Sulfur-Iodine (S-I) cycle for Hydrogen Production	\$187187

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

INL - Idaho National Lab

Project ID	Project Name	FY Total
TM101	Mathematical Characterization and Synthetic Generation of Spatial Structures Across Multiple Scales Using Fractal Techniques	\$187057
TM102	Modeling complexes containing transuranic elements	\$243809
TM103	Kinetic Monte Carlo Method for Calculation of Diffusion Coefficients for Defects in Solids	\$68677
Total # of Projects for INL:	89	Total Cost for INL: \$20351318

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

KCP - Kansas City Plant

Project ID	Project Name	FY Total
KC02009-703531	Software-Defined Radio Systems	\$81499
KC03002-703538	Evaluate the Feasibility of a Single-Containment Vessel	\$31458
KC04004-703569	Laser Welding of Small Parts Fabricated Using LIGA Processes	\$190298
KC05002-703581	Continous Air Monitor for Light Elements	\$1818
KC05003-703582	Flexible Telemetry Transceiver	\$307171
KC05005-703584	Accessible Electronics for High-G Packaging	\$64460
KC05006-703586	Anti-Tamper Technology	\$37042
KC05007-703587	Development of Microwave Packaging for RF MEMS	\$2757
KC05009-703589	Model-Based Machining Simulation	\$14620
KC05010-703590	Wireless Sensor Network	\$66659
KC05011-703591	FPGA Based Wireless Data Collection and Monitoring System	\$25599
KC05014-703594	Bore-Aligned, Miniaturized Engagement Simulation System (ESS) Transmitter	\$72345
KC05015-703596	High-Precision, Multi-Point Distributed Initiation Systems Technology	\$66661
KC05016-703597	3-D Capacitor fabrication Using Selective Laser Sintering	\$73675
KC05017-703598	Zigbee Wireless Sensor Network Development	\$2776
KC05019-703601	Fequency Selective RF Palette	\$3387
KC05020-703602	Resistance Bonding using LIGA membranes	\$3930
KC05021-703603	Ultrasonic Evaluation of Nuclear-Grade Steel Bar Stock	\$45301
KC05022-703604	Implementing Zero-Shrink, Low-Temperature Cofired Ceramic Technology	\$38032
KC05023-703605	Optically Triggered Pulse Power Switch	\$74231
KC05024-703606	Wideband High-G Subterranean Transceiver	\$11204
KC05025-703607	Provide proof-of-concept utilizing Charge Deep-Level Transient Spectroscopy (Q-DLTS) and diamond sensors for detection of organics	\$205602
KC05026-703608	Negative Poisson Ratio Structure	\$9093
KC05027-703609	Online Process Monitoring and Control	\$4394
KC05028-703610	Physical Vapor Deposition (PVD)of Thin Films on 3-Dimensional Objects	\$1459
KC05032-703614	Missile Defeat Technology Study	\$503132
KC05033-703615	Vacuum Sealing Microelectronics and Packaging	\$163858
KC06001-703616	Min-Current Solidtron (CCS)	\$94955

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

KCP - Kansas City Plant

Project ID	Project Name	FY Total
KC06003-703618	Rogue Wireless Detection	\$95060
KC06005-703620	Harvesting Energy from Ambient Vibrational Sources	\$45387
KC06006-703621	Additive Manufacturing of Near-Net Shape Metal Parts	\$24381
KC06007-703622	Temporary Bobbin for Miniature Transformer Coil	\$64557
KC06008-703623	Micromolding Nonconductive Parts	\$41297
KC06009-703625	Federated Authentification Technology	\$105190
KC06010-703626	Phased Array Antenna	\$216358
KC06011-703627	Atmospheric Plasma Deposition of DLC Coatings	\$189090
KC06012-703628	Firing System Modeling	\$6383
KC06013-703629	Magneto-resistive Detonator Safing Device	\$11275
KC06014-703630	Virtual Reality Assembly	\$2916
KC06015-703631	Special Finishes for Products	\$38971
KC06016-703632	Placement of Window in 76 Housing	\$1432
KC06017-703633	Embedded Programing for High Band-width	\$2125
KC06018-703634	High Strength Pressure Vessel	\$58554
KC06021-703637	Digital Object Identity	\$97111
KC06023-703639	Advanced RF Microelectronic Development	\$48016
KC06024-703599	Micromechanical Assembly Development	\$55800
Total # of Projects for KCP:	46	Total Cost for KCP: \$3301319

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-2001511DR	Development of High Performance Cold Neutron Spectroscopy at LANSCE	\$54765
LANL-2001517DR	Early Diagnosis of Infection	\$127
LANL-20020072DR	Experimental Investigation of Fundamental Processes Relevant to Fusion Burning, Strongly Coupled, Multi-Material Plasmas	\$353
LANL-20020225ER	Interfacial Solutions: Quasiliquids and Tropospheric Chemistry	\$17
LANL-20030022DR	Novel Physical Behavior of Nanostructured Materials Derived from Interface Atoms	\$1
LANL-20030029DR	Structural Bioinformatics: Inferring Protein Function from Sequence and Structure on a Genomic Scale	\$1
LANL-20030030DR	Neutrino Physics and Fundamental Symmetries	\$1866874
LANL-20030036DR	New States of Matter Near Zero-Temperature Phase Transitions	\$2413
LANL-20030038DR	Stochastic Closure for Multi-Scale Simulations	\$211927
LANL-20030059DR	Clathrate Hydrate Science and Technology	\$377
LANL-20030067DR	Water on Mars	\$8389
LANL-20030068DR	Non-equilibrium Electron Spin Transport and Dynamics in Solids	\$2060
LANL-20030091DR	Actinide Partitioning at Solid-Solution Interfaces	\$639
LANL-20030119ER	Synthesis of Labeled Glycosaminoglycans for Structural and Dynamical Studies of Macromolecular Complexes	\$1970
LANL-20030129ER	Collisionless Magnetic Reconnection in 3D Geometries	\$118390
LANL-20030162ER	Automatic Detection of Salient Objects in Real-world Imagery	\$177319
LANL-20030227ER	Estimation of Aquifer Recharge Using Time-Lapse Gravity Surveys	\$14543
LANL-20030310ER	Polymer-Assisted Aqueous Deposition (PAAD) of Metal-Oxide Films	\$1127
LANL-20030419DR	Assembly and Actuation of Nanomaterials Using Active Biomolecules	\$71
LANL-20030568PRD1	Interaction of Magnetism and Superconductivity in Novel Superconductors	\$34964
LANL-20030579PRD1	Cosmic Cinematography: Opening a New Window for Discovery in Astrophysics	\$39070
LANL-20030604ER	Preparation & Characterization of Inorganic & Organic High-Nitrogen Energetic Materials	\$2746
LANL-20030623ER	Space Weather Foundations	\$7129
LANL-20030624	Dynamical Astrophysics	\$711
LANL-20030635PRD2	heoretical and Computational Studies of the Behavior of Plasma at the Edge of a Tokamak	\$731

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20030770PRD3	Short-term Decoherence in Quantum Optics	\$27758
LANL-20030837PRD4	An Organometallic Chemistry Approach to the Preparation of Fluorinated Polymers	\$34238
LANL-20030839ER	Proteins in Protein Networks	\$421415
LANL-20030840PRD4	Novel Antibiotic Targets for B. anthracis: Fosmidomycin and Siderophores	\$83202
LANL-20030859PRD4	Fault Tolerant and Recovery-Oriented Computing	\$23796
LANL-20030861PRD4	Mechanisms of Creep in Bulk Metallic Glasses	\$1157
LANL-20030865PRD4	Compton Imaging and High Energy Astrophysics	\$15848
LANL-20030874PRD4	Ion Beam Slicing With Point Defect Engineering	\$41597
LANL-20040014DR	Localization and Itinerancy in Plutonium	\$2017157
LANL-20040031DR	Scalable Reconfigurable Computing: Exploiting an Exponential Increase in Computational Density	\$1438684
LANL-20040040DR	Search for Variation of the Fine Structure Constant with Optical Frequency References	\$1511939
LANL-20040042DR	Science of Geological Carbon Sequestration: Integration of Experimentation and Simulation	\$1107404
LANL-20040049DR	Solid-State Quantum Information Processing: A New Approach to Demonstrate Quantum Entanglement	\$1202755
LANL-20040064DR	Energetic-Particle Interactions with Dense Plasmas: A Study Relevant to Boost and to Fast Ignition Using Laser-Driven High-Current Ion Beams	\$2008115
LANL-20040069DR	High-Power MM-Wave Source Technology	\$1625663
LANL-20040072DR	Radiography with Background Radiation	\$1688021
LANL-20040087DR	Understanding the Molecular Mechanisms of Pathogen Recognition by the Immune System: Biothreat Reduction through Predictive Science	\$1844375
LANL-20040093DR	Understanding Electronic and Magnetic Communication Between f-Electrons in Actinide and Lanthanide Materials	\$1638823
LANL-20040104DR	Testing Time-Reversal Symmetry with Ultracold Neutrons and with Solid State Systems	\$1559945
LANL-20040120DR	Fluorobody Switches: Recognition Proteins Which Fluoresce Upon Binding Targets	\$1153644
LANL-20040134DR	Bose-Einstein Condensate Physics: Dynamics and Applications	\$1876557
LANL-20040141DR	Statistical Physics of Infrastructure Networks	\$1870668

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20040167ER	Exploring the Turbulent-Viscosity Effect in Solar-Wind/Magnetosphere Coupling	\$125556
LANL-20040171ER	Fermion Quantum Phase Transitions	\$292477
LANL-20040184ER	Response Networks of M. Tuberculosis and Bio-Threat Agents	\$293086
LANL-20040193ER	Dark Lightning: Throwing Light on Monster Convective Storms	\$244851
LANL-20040195ER	Precision Cosmology: A First Principles Approach to Galaxy Clustering	\$295064
LANL-20040201ER	The Dynamic Response of Polymers Under Stress Using a Unique Probe for the Molecular Events Governing Materials Responses	\$295053
LANL-20040212ER	Detecting Weak Gaseous Plumes in Hyperspectral Remote Sensing Imagery	\$342885
LANL-20040213ER	Ion-Beam Synthesis and Luminescence Characterization of a New Class of Nanomaterials-Nanophosphors	\$246050
LANL-20040218ER	Error-Minimizing, Implicit Adaptive-Grid Solutions of Time Dependent Problems	\$259259
LANL-20040236ER	Computational Complexity and Quantum Entanglement	\$336200
LANL-20040237ER	New Mathematical Tools for the Quantum Dynamics of a Bose-Einstein Condensate	\$283054
LANL-20040256ER	Hybrid Density Functional Theory Investigations in Condensed Matter	\$317802
LANL-20040259ER	Nonlinear-Acoustic Tomographic-Imaging of Damage in Solids	\$354250
LANL-20040262ER	Understanding and Predicting the Initiation of DNA Transcription	\$315242
LANL-20040284ER	The Dynamics of Two-Dimensional Turbulence	\$283016
LANL-20040291ER	Tracking Single Molecules in Three Dimensions	\$274694
LANL-20040294ER	Study of Phases with Hidden Order Parameter in the Actinides and other Strongly Correlated Electron Systems	\$324481
LANL-20040295ER	Design Principles of Genetic Regulatory Networks	\$348984
LANL-20040301ER	Understanding Global Planetary Processes Through a Study of the Moon's Surface Composition	\$366144
LANL-20040326ER	Massively Parallel Fabrication of Complex Nanoscale Structures in Soft Materials	\$247095
LANL-20040344ER	Understanding and Controlling the Chemistry of Biocidal Polymers	\$256695
LANL-20040358ER	Measurement of Vibrational Anharmonicities for Chemical Dynamics	\$329382
LANL-20040359ER	Spatially-Isochronous Time-of-Flight Mass Spectrometer	\$335307
LANL-20040379ER	Modeling Invariance in Data Space	\$464626

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20040391ER	Quantum Devices for Electronic Circuitry and Advanced Detection	\$348131
LANL-20040393ER	Genetic Programs Underlying Key Physiological States in Burkholderia Pseudomallei	\$202235
LANL-20040408ER	Coherent Control of the Raman Fingerprint Spectrum Via Single-Pulse Coherent Anti-Stokes Raman Scattering	\$337252
LANL-20040412ER	Mining the Sky with Both Eyes Open: Stereoscopic Monitoring of the Night Sky	\$304000
LANL-20040415ER	Supernovae Neutrinos	\$332403
LANL-20040419ER	Statistical Models for Natural Graphs	\$258267
LANL-20040430ER	Synthesis of Continuous Carbon Nanotubes	\$323482
LANL-20040438ER	Quantum Control and Information Processing Using Semiconductor Quantum Dots	\$305810
LANL-20040454ER	High Throughput Isolation of Optimal Protease Substrates	\$335980
LANL-20040461ER	Secure Communications in Fiber Links Using Randomness and Nonlinearity of Optical Fibers	\$237091
LANL-20040478ER	Hyperthermal Surface Ionizer for Aerosol Chemical and Biological Analysis	\$338232
LANL-20040480ER	Self-Healing High-Performance Parallel Computers	\$238723
LANL-20040481ER	Efficient Modeling of Systems with Uncertainty on Multiple Scales	\$270818
LANL-20040508ER	The Synthesis of Single Walled Carbon Nanotubes with Specific Diameters	\$419740
LANL-20040840DR	Computational Models of the Water Cycle of Semi-Arid Basins	\$3719
LANL-20040842DR	Fission Fragment Physics in Extreme Environments (U)	\$373444
LANL-20040844DR	Phase Transitions and Strong Anharmonicities in Plutonium	\$2430700
LANL-20040849ER	Imaging Optical Interferometry	\$234840
LANL-20040882PRD1	Exploring Protein Cameleons Using Single Molecule Spectroscopy	\$74248
LANL-20040884PRD1	Energy Dissipation in Laminate and Particulate Composites with Nano- or Micro-meter Phases	\$90094
LANL-20040885PRD1	Mechanistic Studies on Fe(III)(hydr)oxide Dissolution and Actinide Mobilization in an Aqueous Aerobic Environment	\$107189
LANL-20040908PRD1	Thermal Shrinkage and Compressional Expansion in Framework Oxides: Underlying Structural Mechanisms and Phase Stability	\$77168
LANL-20040909PRD1	New Theoretical and Computational Approaches to Ultra-Relativistic Heavy Ion Collisions	\$150703

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20040919PRD1	Optical Probing of Dense Structured Media such as Clouds: 3D Radiative Transfer at Work	\$88521
LANL-20040937PRD2	Valence Ambiguity in Organoactinide Chemistry	\$24506
LANL-20040941PRD2	Magnetic Field Induced Quantum Critical Points in Correlated Electron Systems	\$36762
LANL-20040953PRD2	Amine-Boranes for Chemical Hydrogen Storage	\$89347
LANL-20040954PRD2	Quantifying Information Flow and Information Integration in Complex Networks	\$113116
LANL-20040961PRD2	Femtosecond Optical Combs for Precision Spectroscopy	\$63591
LANL-20040969PRD2	Coherent Terahertz Radiation From Intense Laser-Produced Plasmas	\$84253
LANL-20040978PRD2	Tunable Photonic Crystal/Quantum Dot lasers	\$126194
LANL-20040980DR	Advanced Computer Architectures and Algorithmic Implications	\$1483391
LANL-20040985PRD3	MiniBooNE Neutrino Oscillation Analysis	\$94471
LANL-20041005PRD3	Bose-Einstein Condensation of Spins in Quantum Magnets	\$54391
LANL-20041010DR	Dynamics of Complex Networks: Biology, Information, and Security	\$509744
LANL-20041027PRD3	Materials Interactions with Terahertz Radiation	\$126443
LANL-20041031PRD3	Dynamics of Quantum Phase Transitions	\$115899
LANL-20041034PRD3	Rydberg Atom Interactions in Fields and Plasmas	\$108784
LANL-20041040PRD3	Predictive Stellar Evolution	\$125994
LANL-20041043PRD3	Gamma-Ray Bursts Afterglows in the Swift Era: Perspectives of New Major Discoveries	\$140494
LANL-20041061PRD3	Investigation of the Dynamics of Protein Misfolding and Aggregation	\$124147
LANL-20041075ER	Investigations into the Fundamental Chemistry and Structure of Hybrid Organic-Inorganic Materials	\$731
LANL-20041078ER	Nano-Scale Physics and Near-Contact Hydrodynamics	\$369649
LANL-20041086ER	Nuclear Materials Detection Algorithm Development for Port-of-Entry Applications	\$139947
LANL-20041091ER	Generation of Novel Materials with Applications to L.A.N.L. Programmatic Goals	\$277197
LANL-20041100PRD4	Thermal Transport: a Probe of the Bose-Einstein Condensate in Quantum Magnets	\$126853
LANL-20041105PRD4	Ferroic Films for Multifunctional Devices	\$127819
LANL-20041118PRD4	Intercalated Nanocomposites - Innovative Fuel Cell Catalysts	\$131707
LANL-20041122PRD4	Nonlinearity and Chaos in Spatially Extended Dynamical Systems	\$46193

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20041131PRD4	Quantum Simulations in Optical Lattices	\$120969
LANL-20041132PRD4	Ionic Liquids: A New Platform for Sensors	\$131138
LANL-20050014DR	Resolving the Aerosol-Climate-Water Puzzle: Predictive Science for Global Stability and Security	\$1808235
LANL-20050031DR	Coming Out of the Cosmic Dark Ages - The First Stars in the Universe	\$1786467
LANL-20050043DR	Pu-H Interactions: Studies of Plutonium Hydride Phenomena (U)	\$1808098
LANL-20050064DR	ProtoCell Assembly	\$1836429
LANL-20050066DR	Lagrangian Measurements of Fluid Mixing	\$1935879
LANL-20050076DR	Cold Atom Quantum Simulators	\$1888284
LANL-20050107DR	Material Response During Dynamic Loading at Subpicosecond Time and Nanometer Length Scales	\$1817383
LANL-20050123DR	Metabolome Scale Characterization of the Biothreat Agent, Bacillus Anthracis	\$1708311
LANL-20050127DR	Be-Specific Human Immune Response and Development of Chronic Beryllium Disease	\$1725710
LANL-20050155DR	Rational Vaccine Design: Theory and Experimental Validation	\$1745310
LANL-20050158ER	Salient Anomaly Detection: In Search of the Unknown in Images and Signals	\$325329
LANL-20050161DR	Thinking Telescopes: Pursuing a New Paradigm for Discovery in Observational Science	\$1840082
LANL-20050164DR	Probing New Physics with Ultra-Cold Neutrons	\$1521761
LANL-20050184DR	New Americium Delta-A Metric for Primary Certification (U)	\$1502270
LANL-20050199ER	Processing and Properties of Bulk Nanostructured Alloys	\$325261
LANL-20050246ER	Gamma-Ray-Channeling Optics	\$348941
LANL-20050271ER	A System-Scale Theory for Fast Magnetic Reconnection	\$281105
LANL-20050277ER	Laser-Cooling Molecules to Millikelvins	\$337555
LANL-20050290ER	A Microfabricated Single Molecule Sorter	\$289211
LANL-20050304ER	Redox Interplay Underpinning 4f-Element Metallocene-Based Magnetic Systems	\$257622
LANL-20050306ER	Exploration of the Role in Interfaces in Nanolayered Composites in Creating Radiation Damage Tolerant Materials.	\$318489
LANL-20050307ER	HAWC: The Next Generation VHE All-Sky Gamma Ray Observatory	\$226712
LANL-20050315ER	Implicit Adaptive Mesh Refinement: A Magnetohydrodynamics Application	\$310881

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20050323ER	Testing Embedded Model Assumptions of Stable Isotopic Dynamics with Continuous Sampling: Are Modelers' Assumptions of the Global Carbon Cycle Correct?	\$428362
LANL-20050343ER	Atomistic Studies of Fast Chemical Processes in Nano-Structured Metastable Composites	\$279482
LANL-20050360ER	Low-Threshold, Single-Exciton Nanocrystal Lasing Using Engineered Exciton-Exciton Interactions	\$373241
LANL-20050363ER	Combustion Enhancement Using Plasma	\$374212
LANL-20050377ER	Observing Individual Antibody-Antigen Encounters for Decades of Timescales	\$263147
LANL-20050379ER	Taming and Accelerating Particle-In-Cell	\$335105
LANL-20050388ER	Spatio-temporal Plasmonics: Controlling Plasmon Polaritons at the Nanoscale	\$404503
LANL-20050400ER	Eliminating PCR in Biothreat Detection: Highly Multiplexed Nucleic Acid Dipsticks for Rapid and Sensitive Pathogen Identification	\$466000
LANL-20050402ER	Immune Response to West Nile Virus in Birds	\$391122
LANL-20050411ER	Quantitative Modeling of Living Neuronal Networks in Vitro	\$357476
LANL-20050425ER	Computational Foundations for a New Class of Digital Filter Banks	\$371853
LANL-20050430ER	Fulde-Ferrell-Larkin-Ovchinnikov Inhomogeneous Superconducting State	\$387201
LANL-20050480ER	The First Complete Classification Algorithm	\$351701
LANL-20050484ER	Novel High-Speed Electro-Optic Switches Based on Domain Microoptics Embedded in a Ferroelectric Chip	\$285547
LANL-20050506ER	Hierarchical Assembly of Porous Materials: Obeying Bio-Inspired Allometric Scaling Laws	\$320637
LANL-20050531ER	Neyman-Pearson Learning	\$556105
LANL-20050540ER	A New Form of Secure Communication: Spatial Encryption Using Superluminal Sources	\$244026
LANL-20050559ER	Plasma Catalyzed Coal Gasification	\$318022
LANL-20050566ER	Ion Beam Synthesis of Ferromagnetic Semiconductors	\$302828
LANL-20050583ER	High Efficiency Carrier Multiplication Using Impact Ionization in Semiconductor Quantum Dots	\$317824
LANL-20050626ER	High-Valent Ruthenium Oxides on Tio2: Toward the Development of Light-Driven Oxidation Catalysts	\$220737
LANL-20050631DR	Nonlinear Behavior in Complex Systems	\$644393
LANL-20050632DR	Cooperative Phenomena in Soft Matter	\$1044937

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20050633DR	Exploiting Emergent Materials Behavior on the Nanoscale	\$1606662
LANL-20051087ER	Antineutrino Monitoring of Reactors	\$384218
LANL-20051092ER	Design of Experiment Construction and Assessment	\$33171
LANL-20051098PRD2	Metallic Quantum Dot Superlattices	\$124046
LANL-20051100PRD1	Hybrid Quantum-Dot/Photonic-Crystal Structures	\$103894
LANL-20051102PRD1	Improving the Predictive Capabilities of Complex, Spatially Distributed Environmental Models	\$120877
LANL-20051104PRD1	Trapped Ion Quantum Simulations	\$74465
LANL-20051118PRD1	Control of Inelastic Collisions for Improved Atom Interferometry	\$89387
LANL-20051121PRD1	Measuring Neutrino Properties with Oscillation Experiments	\$10272
LANL-20051122PRD1	Photovoltaics of Nanocrystalline TiO ₂	\$116330
LANL-20051124PRD1	Tuning Plutonium Compounds Through the Localized/Itinerant Crossover	\$134955
LANL-20051125PRD1	W-Band Photonic Band Gap Structure Research	\$113094
LANL-20051127PRD1	Artificial Design of Novel Multiferroic Materials	\$103205
LANL-20051132PRD1	Exploration of Deformation Physics at Nanometer Scale	\$130906
LANL-20051143PRD1	Hydrogen Storage in Novel Molecular Compounds	\$134703
LANL-20051148PRD2	New Paradigms for Modeling Communicable Diseases	\$127041
LANL-20051149DR	Cross sections for the Isomer of ²³⁵ U	\$723919
LANL-20051164DR	Nanoscale Fluctuations in Multifunctional Materials	\$1382281
LANL-20051169ER	Physics of Astrophysical Jets	\$418408
LANL-20051194PRD2	Statistical Mechanics Approaches to Parallel Computing	\$127171
LANL-20051222PRD3	High Energy Particles in Astrophysical Outflows	\$121275
LANL-20051239PRD3	Computer Simulations of Phase Stability and Microstructure Evolution in Alloys Using Hybrid Molecular Dynamics and Phase-Field Approaches	\$125246
LANL-20051243PRD3	The Neutrino Matrix and Beyond	\$108886
LANL-20051257PRD3	Investigation of Fuel Cell Electrocatalysts for Improved Activity and Durability	\$138373
LANL-20051265PRD3	Three-dimensional Micro Architectures for Neural Interfaces	\$140928
LANL-20051281PRD3	Size Effects in Nanoscale Ferroelectric Thin Films	\$83543
LANL-20051282PRD3	Theory and Trapped Ion Quantum Simulations	\$125220
LANL-20051284PRD3	Two Dimensional Spectroscopic Studies of Biexcitons in Quantum Dots	\$126394

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20051286PRD3	A Multiscale Approach to Modeling Continental Rift Tectonics	\$94574
LANL-20051320PRD4	From Actinide Electronic Structure to f-Element Molecular Photomagnets	\$79236
LANL-20051325PRD4	The Formation of the First Stars and Their Feedback Effects on Cosmological Structure	\$127378
LANL-20051330PRD4	Defect- and Fault-Tolerant Nano-computing Architectures	\$125819
LANL-20051336PRD4	Effects of Length Scale on the Fracture Behavior of Ultra High Strength Nano-composite Materials	\$116237
LANL-20051345PRD4	Biological and Chemical Sensor Design Using Linearly-Scaled TD-DFT Methods	\$120363
LANL-20051347PRD4	Ultrafast Dynamics of Novel Magnetic Materials by Time Domain Spectroscopy	\$92896
LANL-20051348PRD4	Quantum Fluctuations of Event Horizons	\$76404
LANL-20060019DR	Structure and Bonding in Actinide Oxides	\$1655270
LANL-20060021DR	Dynamics of the Onset of Damage in Metals under Shock Loading	\$1815017
LANL-20060039DR	New Approaches to Quantum Computing and the Dynamics of Quantum Phase Transitions	\$1079760
LANL-20060040DR	Pathogen Detection Based on Biomodulation	\$1221576
LANL-20060043DR	Strongly Correlated Electrons: Duality and Implications	\$712029
LANL-20060046DR	Image Reconstruction with Time-Reversal Mirrors	\$386357
LANL-20060049DR	Heavy Quarks as a Probe of a New State of Matter	\$1872283
LANL-20060060DR	DREAM: A Dynamic Radiation Environment Assimilation Model to Understand Acceleration, Transport, and Losses in Natural and HANE-Produced Radiation Belts	\$1437039
LANL-20060079DR	Science-Based Prediction and Control of Complex Manufacturing Processes	\$1316237
LANL-20060081DR	Mix Processes in Inertial Confinement Fusion	\$1508644
LANL-20060088DR	Advanced Actinide Separations in Alkaline Media for Spent Nuclear Fuel and Defense Materials Processing	\$1091739
LANL-20060097DR	Biological Effects of Molecularly Engineered Nanomaterials	\$1265419
LANL-20060136DR	New Classes Of Materials For Gamma-Ray And Neutron Detection	\$1533841
LANL-20060226ER	Development of an Engineering Model for Rubber Elasticity	\$215269
LANL-20060230ER	Nascent Protein Folding Inside the Tunnel of the Ribosome: Cotranslational Folding	\$273538

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20060253ER	Nanobiomaterials: Building New Nanoarchitectures Using Biomolecular Scaffolds	\$284130
LANL-20060268ER	Automatic Video Analysis Integrating Depth, Shape, Texture and Color	\$295379
LANL-20060270ER	Automated Induction of Templates for Extracting Information from Text	\$300168
LANL-20060272ER	Monte Carlo Estimation of Eigenvalues of Ultradimensional Matrices and Continuous Operators	\$249746
LANL-20060302ER	New Method for Complex Contingency Analysis	\$261575
LANL-20060305ER	Energy Distributions in Granular Flows	\$249592
LANL-20060312ER	MRI in Microtesla Magnetic Fields with Simultaneous MEG	\$353420
LANL-20060317ER	Understanding the Process of Intercalation Using Stable Isotope Labeled Polyaromatic Hydrocarbons (PAHs) and Oligomeric DNA; the Quantitation of Weak Bonding in DNA.	\$501411
LANL-20060318ER	Seeing Undetectable Cancers with Time-Reversed Ultrasound	\$342803
LANL-20060321ER	Chemical Thermoacoustics	\$301215
LANL-20060340ER	Multigene Correlations and Their Implications for Cardiovascular Disease	\$261520
LANL-20060346ER	Development of Redox Affinity Materials for the Separation of Carbon Nanotubes into Pure Chiral Fractions	\$315765
LANL-20060350ER	A Faster Multipole Method	\$313077
LANL-20060357ER	The S-Process in the Sm-Eu-Gd Region - A Probe for Stellar Mixing	\$368749
LANL-20060360ER	Quantifying the Role of the Cold Plasmasphere in the Loss of the Electron Radiation Belts	\$123278
LANL-20060386ER	Surface Enhanced Raman (SERS) Based Flow Cytometry Detection	\$315660
LANL-20060392ER	Processing of Ultra-High Strength Electrical Conductors using a Novel Nano-Twinned Structure	\$305053
LANL-20060395ER	Nanocomposite Thin Films for Surface Assisted Mass Spectrometry	\$291283
LANL-20060399ER	Role of Electrostatic Forces in Space and Astrophysics	\$874963
LANL-20060407ER	Detecting Spinons with the Wiedemann-Franz Law	\$321976
LANL-20060416ER	Stabilization of Hydrogen Clathrates --- Engineering a Solution to Hydrogen Storage	\$302218
LANL-20060437ER	Functional Proteomics Studies of Bacillus anthracis	\$150699
LANL-20060473ER	Novel Physics Inspired Approach to Error-Correction	\$300912

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20060494ER	Amplification of Surface Plasmons by Stimulated Emission from Semiconductor Nanocrystals	\$371052
LANL-20060495ER	Exploring the Darkness: Cosmic Voids	\$721345
LANL-20060497ER	Use of Strain Engineering to Tune the Physical Properties of Nanoscale Metal-Oxide Films	\$391454
LANL-20060518ER	Improved Molecular Catalysts for Water Splitting	\$277600
LANL-20060542ER	Generation, Detection, and Manipulation of a Single Magnetic Spin	\$333965
LANL-20060551ER	Simulation and Modeling of the Quantum Response	\$250935
LANL-20060558ER	Quantum Nondemolition Detection of Photons	\$283386
LANL-20060581ER	Non-blinking and Robust Quantum-Dot Fluorophores for Applications in Biology	\$341027
LANL-20060589ER	Manipulation and Control of Electron Spins in Semiconductors with Strain Engineering	\$318065
LANL-20060593ER	Shedding Light on the Mechanical Unfolding of Individual Proteins	\$272982
LANL-20060607ER	Acoustic Effects on Microscopic and Core-Scale Colloid Interactions and Porous Fluid Transport	\$311530
LANL-20060617ER	Nanoscale Textured Composite Energetic Materials	\$320767
LANL-20060685ER	Structure and Evolution in Cosmology and Astrophysics	\$304409
LANL-20060686ER	Complex Dynamical Climate Systems Analysis	\$499232
LANL-20060687ER	Space Weather Processes and Mechanisms	\$721016
LANL-20060688ER	Solid Earth Geoscience: Transient & Steady-State Earth Processes	\$422178
LANL-20060689ER	High-Throughput, Label-Free Affinity Screening	\$54061
LANL-20060690ER	Development of a NESSUS Application Interface for Probabilistic Engineering Analysis	\$37715
LANL-20060691ER	Novel Applications of Nanoporous Metal Foams	\$52741
LANL-20060693ER	Next Generation Data Structure for Carte Blanca	\$69711
LANL-20060694ER	Supersymmetry Breaking in Various Dimensions	\$313472
LANL-20060697ER	Statistics for the Engineering and Physical Sciences	\$178963
LANL-20060698ER	Investigating Coherent Flavor Evolution in Dense Neutrino Systems	\$95178
LANL-20060699ER	Photon Number Resolving Detectors	\$61124
LANL-20060700DR	Computational Methods for Protein Function Inference	\$990618
LANL-20061378PRD1	High P-T Synthesis of Superhard Carbon Nitride from Graphite-Like Precursors	\$52089

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20061383PRD1	Lifting the Quantum Critical Conundrum	\$107506
LANL-20061387PRD1	Exploring the Membrane Penetration Machinery of Bacterial Toxins	\$87177
LANL-20061388PRD1	Numerical Techniques of Rifting and Passive Margin Formation: The Role of Mantle Plumes	\$78276
LANL-20061396PRD1	Studies of Sub-Micron Ferromagnetic Particles using Magnetic Resonance Force Microscopy	\$101435
LANL-20061397PRD1	Measurements of Absorption and Scattering by Aerosols: How do they Offset Global Warming?	\$118672
LANL-20061399PRD1	Main Group Hydride Chemistry for Hydrogen Storage	\$94113
LANL-20061402ER	The Secret Life of Quasiparticles	\$124054
LANL-20061416ER	Energetic Chlorine Donors for Perchlorate-Free Pyrotechnic Formulations	\$21285
LANL-20061423ER	Improved Length Scaling in Accelerated Molecular Dynamics Methods	\$213307
LANL-20061435ER	Experimental Study of Driven Magnetic Relaxation in a Laboratory Plasma	\$349807
LANL-20061438PRD2	Interface-Governed Behavior of Nano-Layered Metallic Composites	\$67584
LANL-20061442PRD2	Ion Synthesis of Novel SiGe Structures	\$6763
LANL-20061449PRD2	Non-Equilibrium Stochastic Processes in Classical and Quantum Systems	\$39468
LANL-20061456PRD2	Searching for New Uranium Based Superconductors	\$18177
LANL-20061468PRD2	Fluorescence Lifetime Spectroscopy by Flow Cytometry	\$36159
LANL-20061471DR	Advancing the Chemistry Material Science and Theoretical Understanding of Actinides	\$262354
LANL-20061475PRD2	Three-dimensional Magnetic Reconnection Experiments	\$50534
LANL-20061493DR	High-Resolution Physically-Based Model of Semi-Arid River Basin Hydrology	\$467741
LANL-20061494ER	A Strategy for Effective Antibiotic Delivery	\$173500
LANL-20061502ER	Laser Induced Breakdown Spectroscopy	\$37335
LANL-20061515ER	Polyazido Precursors for Synthesis of Novel Drugs	\$141873
LANL-20061517ER	Trapping Rare Culture Mutations for Bioweapon Attribution and Forensics	\$151973
LANL-20061519ER	Feasibility Study on Heart Rate Variability Analysis for Fitness Assessment	\$91280
LANL-20061522ER	Aligned Crystalline Silicon Films for Solar Cells	\$237671
LANL-20061526PRD3	Multiscale Modeling of Irradiation-induced Defect Processes in High-Cr Ferritic Steels	\$21260

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20061528PRD3	High Efficiency Carbon Nanotube-TiO2 Nanostructured Solar Cells	\$6538
LANL-20061558PRD3	Theoretical Studies of Cold Atom Fermi-liquids and Bose-Einstein Condensates on Chips	\$22110
LANL-20061563PRD3	Search for Temporal Variation of the Fine Structure Constant	\$43655
LANL-20061566ER	A Generalized Inference Modeling Methodology with Application to Comparative Terrorist Event Reconstruction	\$186297
LANL-20061567ER	Avian Influenza	\$384676
LANL-20061579ER	Quantifying the Relation of Hurricane lightning to Hurricane Intensification	\$63281
LANL-20061585ER	Visualization Applied to Electronic Properties of Novel Superconductors	\$134169
LANL-2999999	LDRD Miscellaneous Costs	\$26306
Total # of Projects for LANL:	301	Total Cost for LANL: \$125374372

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LBNL - L. Berkeley National Lab

Project ID	Project Name	FY Total
LB04004	Autonomous Sensors for Ocean Dissolved Organic Matter	\$357060
LB04007	Techniques of Sample Controls for a Transmission Electron Aberration-Corrected Microscope	\$365847
LB04010	Molecular Microscopy and Tomography	\$290534
LB04012	Designing a Novel Reactor Neutrino Experiment for Measuring the Unknown Mixing Angle Theta13	\$455638
LB04013	Coherent X-ray Diffraction Imaging (CXDI)	\$248252
LB04014	Neuroimaging with Advanced Molecular Probes	\$433853
LB04017	Research and Development for Double Beta Decay Experiments	\$438965
LB04019	Critical Accelerator Technologies for Future Advanced Light Sources	\$1085952
LB04025	California Water and Energy System: An Approach for Addressing Future Crises	\$131669
LB04027	Spectroscopy and Dynamics of Pure and Doped Helium Nanodroplets	\$145991
LB04029	Advanced Computational Methods for Photon- Molecule Collision Processes	\$487354
LB04030	Ultrafast Magnetization Dynamics	\$219960
LB04038	Gas Phase Studies of the Building Blocks of Life	\$103159
LB04041	High-throughput Production of Proteins and Protein Complexes	\$130239
LB04043	World Energy Scenarios: The Crucial Role of Energy Demand	\$189932
LB04044	Lensless Imaging of Yeast Cells	\$62868
LB05002	Advanced Detectors to Understand the Early Universe	\$289993
LB05003	Behavior and Impact of Nanoparticles in the Environment	\$215463
LB05005	Modeling human disease in Drosophila melanogaster	\$178697
LB05007	Oxygen Catalysis for Biomimetic Energy Conversion Chemistry	\$89708
LB05008	Cryptographic Foundation for New Generation Distributed Systems	\$186562
LB05009	Unmasking the Human Genome Alternative Splicing Program	\$213572
LB05010	Novel Imaging Detectors for Materials and Biology Research	\$609985
LB05011	Micro-characterization and Chemical Micro-dynamics of Atmospheric Mineral Dust	\$135998
LB05012	Constraining Ammonia Emission Inventories for Control of Air Quality	\$142130
LB05013	Synthetic cytoskeleton: Protrusive Structures for Reconstituted Cell Motility	\$87782
LB05016	Light-activated and Regulated Ion Channels and Transporters	\$227579

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LBNL - L. Berkeley National Lab

Project ID	Project Name	FY Total
LB05017	Highly Efficient PLED Through Polymer Morphology Control	\$278100
LB05019	Time-resolved X-ray Absorption Spectroscopy of Metalloporphyrins	\$131570
LB05020	Development and Application of Quantum Monte Carlo (QMC) Methods to Biological Systems	\$219961
LB05021	Rapid Characterization of Microbial RNAs Using Artificial Nanopores	\$197980
LB05022	Enabling High Energy Density Physics	\$508924
LB05024	Left-Handed Nanoscale Meta-Materials: Towards the Optical Domain	\$195598
LB05026	New Capabilities in Nuclear Astrophysics and Radiation Biology Using Neutrons at the 88-Inch Cyclotron	\$217000
LB05027	New Directions for Theoretical Physics at the TeV-Scale	\$365289
LB05028	Analysis of High-temperature Polymer-electrolyte Fuel-cell Phenomena	\$142262
LB05029	Enhancing Commodity Processors with Vector Components for Increased Scientific Productivity	\$299930
LB05030	Improved Spectroscopy of Weakly Bound States in Nuclei	\$255999
LB05031	Advanced Computational Tools for Electric Power Systems	\$388601
LB05032	Statistical Feature Modeling for Scientific Data Via Basis Decomposition	\$120175
LB05033	NanoARPES: A New Detector for Nanometer-scale Electronic Structure Measurements	\$201716
LB05035	Computational and Theoretical Studies of Bulk and Nano Solid Systems	\$90962
LB05036	Biogeochemical Reaction Rates and Pathways in Porous Media	\$145554
LB05037	New Approach for the Catalytic Conversion of Methane and other Inert Hydrocarbons	\$116073
LB05038	Experimental Signatures of Deconfined Phases and Phase Transitions	\$101800
LB05039	Low Energy Spread Electron Source	\$176882
LB05042	Improved Phase Contrast for Cryo-EM of Biological Machines and Subcellular Structure	\$102654
LB05043	Scientific Basis for Advanced Geologic Storage Technologies	\$232095
LB05044	Statistical Dynamics of Protein Evolution	\$176830
LB05045	Science and Technology of Quantum Materials	\$329974
LB06001	Microarray Technology for Fungal Identification	\$87948
LB06002	Electron Microscopy of Soft Matter in Two and Three Dimensions	\$321514

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LBNL - L. Berkeley National Lab

Project ID	Project Name	FY Total
LB06003	High-Stability Beam Handling in Electron Storage Rings with Applications to High Energy Colliders and Light Sources	\$143764
LB06004	Investigation of the Microbial Processes Involved in Electron Transfer onto the Anode of a Biological Fuel Cell	\$389997
LB06005	Tailoring the Self Assembly of Functionalized Biomolecular Building Blocks	\$198421
LB06006	Visible Light-driven Water Oxidation in Mesoporous Solids	\$189414
LB06007	Arsenic ElectroChemistry	\$104936
LB06008	Magnetic Control of Spatial Organization at Bio-Membranes	\$144678
LB06009	Compositional and Functional Analysis of Cell Walls During Metal-bacterial Interactions	\$173011
LB06010	Metagenomics-Enabled Analysis of Termite Hindgut Microbiota for Biomass Conversion and Cleaner Energy	\$92682
LB06011	Terahertz-Frequency Conductivity and Ultrafast Optical Excitations in Single-Walled Carbon Nanotubes	\$102967
LB06012	Software Application Infrastructure for Efficiently Managing Large-Scale Computational Biology Experiments	\$134997
LB06013	Surface Plasmon-Enhanced Photovoltaic Device	\$108587
LB06014	Measurement of Molecular Shape and Assembly Using X-ray Scattering	\$427871
LB06015	Integrated Microbial Community Genomes Data Management System	\$456745
LB06016	Interrelation of Global Warming and Hydrate Dissociation in Oceanic Accumulations	\$145931
LB06017	New Technology for Permeability Enhancement for Natural Gas Extraction in Tight Reservoirs	\$115870
LB06018	Coupled Modeling of Hydrology, Nutrient Cycling, and Vegetation: Applications to Water Quality and Water Balance	\$120000
LB06019	Development of Cost Effective Sequence-Based Technologies to Identify Genomic Alterations in Cancer	\$243938
LB06020	Aging, Disease and the Mechanical Response of Biological Tissues, Specifically Human Bone	\$130681
LB06021	Photons to Fuels ? The Electrochemical Reduction of Carbon Dioxide to Hydrocarbons	\$420904
LB06022	Determining if PIR51 is a Potential Tumor Suppressor Gene Similar to BRCA2	\$131939
LB06023	Electron Flow Generated by Gas Phase Exothermic Catalytic Reactions Using Metal-Semiconductor Nanodiodes	\$102830

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LBNL - L. Berkeley National Lab

Project ID	Project Name	FY Total
LB06024	Versatile Mini-Scanning Transmission X-ray Microscope (mSTXM)	\$88172
LB06025	Conceptual Study for a Novel Nuclear Astrophysics Accelerator Capability to Measure Nuclear Reactions That Power the Stars	\$116961
LB06026	Extended First Order System Least Squares Finite Elements	\$56202
LB06027	Properties of New Ionic Liquids for Electrochemical Applications and for Extraction of Heavy-Metal Cations from Wastewaters	\$72945
LB06028	Electron Electric Dipole Moment Experiment in a Cold Atom Fountain	\$164332
LB06029	Carbon Based Materials for Renewable Energy	\$97340
LB06030	Biomaterial Engineering for the Production of Photonic Structures and Light Collection Systems	\$129802
LB06031	Fabrication of Photovoltaic Devices Using Nanostructured Biomaterials	\$92501
LB06032	Structure and Function of Intact Cellulosomes	\$142260
LB06033	Computational and Experimental Testing of Methods for Binning Sequences from Metagenomic Data	\$63866
LB06034	Polarizer System for Microfluidics	\$223979
LB06035	Expression Profiling of Radiation and Cancer Susceptibility Genes	\$187870
LB06037	Nanowire Carpet Hybrid Pixel Detectors	\$36280
LB06038	Integration of Synthetic Nano-materials for High Speed, Robust, and Flexible Circuitry	\$47867
LB06039	Analysis for Simulation of Nuclear Energy Systems	\$99607
Total # of Projects for LBNL:	88	Total Cost for LBNL: \$18630280

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
03-ERD-031	Detection and Tracking in Video	\$25322
03-ERD-062	Microbial Pathways	\$260328
03-ERD-064	A Two-Particle Formulation of Electronic Structure	\$82829
03-ERD-070	Laser-Matter Interactions with a 527-Nanometer Drive	\$608552
03-ERD-072	Characterization and Optimization of High-Energy K-Alpha X-Ray Sources	\$29100
03-ERD-076	Persistent Monitoring Platforms	\$360941
03-ERD-077	Plutonium and Quantum Criticality	\$638651
03-ERI-009	Force Spectroscopy to Study Multivalent Binding in Protein-Antibody Interactions	\$60448
03-ERI-010	Intracellular Chemical Measurements: A Generalized Approach with High-Spatial Resolution using Functionalized Nanoparticles	\$44062
03-ERI-012	Using Femtosecond Laser Subcellular Surgery as a Tool to Study Cell Biology	\$69651
03-SI-001	Biological and Synthetic Nanostructures Controlled at the Atomistic Level	\$289251
03-SI-003	ICE: The Image Content Engine	\$629095
04-ERD-001	Nonaqueous Phase Liquid Dissolution in Porous Media: Multi-Scale Effects of Dissolution Kinetics on Cleanup Time	\$210768
04-ERD-002	Multiprobe Investigation of Proteomic Structure of Pathogens	\$332217
04-ERD-004	Three-Dimensional Vectorial Time-Domain Computational Photonics	\$268722
04-ERD-012	Locally Adaptive Mesh Refinement for Linearly Scaling Electronic Structure Calculations	\$474184
04-ERD-013	Acoustic Characterization of Mesoscale Objects	\$191312
04-ERD-017	Broadband Radiation and Scattering	\$163063
04-ERD-019	Development of Absolute Spectroscopic Diagnostics for Nonlocal-Thermodynamic-Equilibrium Plasmas	\$195347
04-ERD-020	Electronic Transitions and Phonons in f-Band Metals at High Pressures	\$442342
04-ERD-021	High-Strain-Rate Deformation of Nanocrystalline Metals	\$461963
04-ERD-023	Short-Pulse Laser Absorption and Energy Partition at Relativistic Laser Intensities	\$330356
04-ERD-024	XChem	\$276398
04-ERD-025	Ultrafast Transient Recording Enhancements for Optical-Streak Cameras	\$523915
04-ERD-027	Magnetic Dynamos and Stars	\$389219

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
04-ERD-028	The Creation of a Neutron Star Atmosphere	\$330369
04-ERD-032	New Generation X-Ray Optics: Focusing Hard X Rays	\$429468
04-ERD-033	Nanosecond Ultrasonics to Study Phase Transitions in Solid and Liquid Systems at High Pressure and Temperature	\$245667
04-ERD-036	Multiscale Characterization of Body-Centered-Cubic Crystals Deformed to Large Extents of Strain	\$552445
04-ERD-037	Dynamic Data-Driven Event Reconstruction for Atmospheric Releases	\$823502
04-ERD-039	Bioforensics: Characterization of Biological Weapons Agents by NanoSIMS	\$196238
04-ERD-040	Developing New Tools for In-Vivo Generation and Screening of Cyclic Peptide Libraries	\$397258
04-ERD-043	Nanomechanics: Strength and Structure for Nanotechnology	\$219440
04-ERD-046	Coupling Micromechanics and Reactive Fluid Flow in Fracture Networks	\$190850
04-ERD-048	High-Average-Power, High-Energy, Short-Pulse Fiber Laser System	\$147929
04-ERD-052	A Coupled Computational and Experimental Approach to Determine Functions of Deeply Conserved "Anonymous" Human Genes	\$571795
04-ERD-054	Development and Application of a Predictive Computational Tool for Short-Pulse, High-Intensity Target Interactions	\$557065
04-ERD-057	Surrogate Nuclear Reactions and the Origin of the Heavy Elements	\$384015
04-ERD-058	Stellar Astrophysics and a Fundamental Description of Thermonuclear Reactions	\$434939
04-ERD-059	High-Energy-Density Galaxy Jets	\$309675
04-ERD-064	High-Brightness, Laser-Driven, X-Ray Source for Nanoscale Metrology and Femtosecond Dynamics	\$109439
04-ERD-065	Creating the Core Conditions of Extrasolar and Solar Giant Planets in the Laboratory	\$299190
04-ERD-069	Ionization Chemistry of High-Temperature Molecular Fluids	\$396801
04-ERD-070	The Large Synoptic Survey Telescope and Foundations for Data Exploitation of Petabyte Data Sets	\$458370
04-ERD-071	Ultrafast, In-Situ Probing of Shocked Solids at the Mesoscale and Beyond: A New Paradigm for Materials Dynamics	\$220902
04-ERD-084	Characterizing the Regulatory Genome: Transcription Factor Proteins and Gene Regulation Networks in Living Cells	\$1465680
04-ERD-085	New Fragment Separation Technology for Superheavy Element Research	\$306985

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
04-ERD-086	Electro-Thermal-Mechanical Simulation Capability	\$651729
04-ERD-088	A New "Natural Neighbor" Meshless Method for Modeling Extreme Deformations and Failure	\$390023
04-ERD-093	An Integrated Laboratory for the Study of Interventional Device Dynamics	\$341962
04-ERD-095	Internet Ballistics: Identifying Internet Adversaries Despite Falsified Source Addressing	\$241670
04-ERD-102	Petascale Simulation Initiative	\$1493917
04-ERD-103	De Novo Identification of Regulatory Regions in Intergenic Spaces of Prokaryotic Genomes	\$193300
04-ERD-104	Time-of-Flight, Secondary Ion Mass Spectrometry Measurement of Metabolites from Single Cells	\$298486
04-ERD-105	NanoBIS Determination of the Unoccupied Electronic Structure of Pu	\$196212
04-ERD-108	Non-Equilibrium Phase Transitions	\$398586
04-ERI-004	Mission to Very Early Earth	\$215001
04-ERI-009	Calcium Dynamics in Human Bone	\$258478
04-ERI-013	Iodine-129 Accelerator Mass Spectrometry for Earth Science, Biomedical, and National Security Applications	\$199184
04-ERI-014	Carbon Flux in a California Grassland Soil Sequence: The Role of Dissolved Organic Carbon in Carbon Sequestration	\$193303
04-ERI-015	Single-Cell Level Investigation of Cytoskeletal Response to External Stimuli	\$113494
04-LW-069	A Single-Molecule Study of the Movement of a DNA Sliding Clamp	\$258947
04-SI-003	Kinetic Simulation of Boundary-Plasma Turbulent Transport	\$920434
05-ERD-003	The Structure and Properties of Nanoporous Materials	\$434141
05-ERD-006	Developing Radiography for Advanced Radiography Capability at Future Large Fusion-Class Lasers	\$375520
05-ERD-007	Physics from the MIPP Experiment	\$491628
05-ERD-008	Emerging Contaminants: Application of Microarray Technology to the Detection of Mixtures of Endocrine-Active Agents	\$279261
05-ERD-009	Nano-Barometers: An In Situ Diagnostic for High-Pressure Experiments	\$16039
05-ERD-011	Neutron Capture Cross Section Measurements at DANCE	\$343453
05-ERD-012	Catalyzing the Adoption of Software Components	\$436406
05-ERD-014	Hysteresis and Kinetic Effects during Liquid-Solid Transitions	\$375528

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
05-ERD-016	Characterization and Control of Laser-Induced Modifications in KDP and DKDP Crystals	\$320874
05-ERD-018	LOCAL: Locality-Optimizing Caching Algorithms and Layouts	\$487629
05-ERD-019	A New Capability for Regional High-Frequency Seismic Wave Simulation in Realistic Three-Dimensional Earth Models to Improve Nuclear Explosion Monitoring	\$263996
05-ERD-021	Heterogeneous Processes at the Intersection of Chemistry and Biology	\$303209
05-ERD-025	Avoiding Surprise: Countering Novel Chem-Bio-Warfare Agent Threats	\$470023
05-ERD-027	Innovative Copolymer Complex to Inhibit the Transport of Biological Aerosols	\$253869
05-ERD-028	CHEMTREAT: Accelerated Remediation of Contaminated Fine-Grained Sediments by a Chemical Clay Cracking and Co-Solvent Flushing Process	\$243043
05-ERD-029	Decontamination of Terrorist-Dispersed Radionuclides from Surfaces in Urban Environments	\$258325
05-ERD-030	Optical Properties as a Real-Time in-situ Materials Diagnostic at Extreme Conditions	\$388260
05-ERD-032	Remote Sensing of Alpha and Beta Particle Sources	\$323517
05-ERD-035	Controls of Fluid Chemistry on Fracture Growth	\$226924
05-ERD-036	Advanced Studies of Hydrogen at High Pressures and Temperatures	\$452470
05-ERD-037	Ceramic Laser Materials	\$185291
05-ERD-038	Integration and Codevelopment of a Geophysical CO2 Monitoring Suite	\$306256
05-ERD-039	Determination of the High-Pressure Melting Curve of Iron	\$210811
05-ERD-041	Risk Analysis of Secure Knowledge Discovery	\$211486
05-ERD-042	Detection and Attribution of Regional Climate Change	\$237587
05-ERD-043	A Dynamically-Coupled Groundwater, Land Surface and Regional Climate Model to Predict Seasonal Watershed Flow and Groundwater Response	\$338935
05-ERD-044	Hydrodynamic, Atomic Kinetic, and Monte Carlo Radiation Transfer Models of the X-Ray Spectra of Compact Binaries	\$307597
05-ERD-045	The Opacity of the Solar Interior	\$556590
05-ERD-047	Environmental Consequences of Large-Scale Deployment of New Energy Systems	\$235845
05-ERD-049	A Multiplexed Diagnostic Platform for Point-of-Care Pathogen Detection	\$363296
05-ERD-050	Developing a Reactive Chemistry Capability for the NARAC Operational Model (LODI)	\$267365

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
05-ERD-053	Rapid Screening of Human Effluents with Single Particle Mass Spectrometry for Early Detection of Respiratory Disease and Cancer	\$413916
05-ERD-054	Enhanced Isolation Performance of Geologic CO2 Storage Sites through Mineral Trapping: Experimental and Field Confirmation of Model Predictions	\$201064
05-ERD-055	Probing Other Solar Systems with Current and Future Adaptive Optics	\$682276
05-ERD-058	RadTracker: Optical Imaging of High Energy Radiation Tracks	\$548481
05-ERD-060	Split-Beam, Short-Pulse Final Optics and Characterization for High-Energy Short Pulses	\$3363805
05-ERD-061	Precision Split-Beam, Chirped-Pulse, Seed Laser Technology	\$1048264
05-ERD-062	Amplifier and Compressor Technology for Split-Beam, High-Energy Short Pulse Generation	\$3039062
05-ERD-063	Dark Matter and Dark Energy Science	\$314324
05-ERD-064	Characterizing Hypothetical Proteins	\$496936
05-ERD-065	Comparative Analysis of Genome Composition with Respect to Metabolic Capabilities and Regulatory Mechanisms	\$584485
05-ERD-066	Mitigation of Optical Damage Sites on UV Optics	\$2303622
05-ERD-067	A Fracture Mechanics and Tribology Approach to Understanding Subsurface Damage on Fused Silica during Grinding and Polishing	\$1965088
05-ERD-068	Development of Hot, LTE-Tunable Radiation Sources for Material Science Studies and Simulating Radiation Transport in Dense Astrophysical Plasmas	\$597078
05-ERD-071	Characterization of the Effect of Short Pulse Exposure on Laser Damage Size, Morphology, and Conditioning in Wide-Bandgap Materials	\$1755916
05-ERD-073	Leading the Quantum Limit Revolution	\$298961
05-ERD-076	Terascope: THz Spectroscopic Imaging for Standoff Detection of High Explosives	\$329203
05-ERD-078	Discovering the Folding Rules that Proteins Obey	\$445615
05-ERD-079	A New Method for Wave Propagation in Elastic Media	\$497014
05-ERD-084	Rapid Defense Against the Next-Generation Biothreat	\$1073816
05-ERI-001	Developing the Physics Basis of Fast-Ignition Experiments at Future Large Fusion-Class Lasers	\$514910
05-ERI-002	Efficient and Reliable Data Exploration via Multiscale Morse Analysis and Combinatorial Information Visualization	\$538832
05-ERI-003	Measuring Plasmon Density of States in Warm Dense Matter	\$195891

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
05-LW-006	Understanding the Nuclear Magnetic Fields	\$196093
05-LW-018	Development of a Chemoenzymatic-Like and Photoswitchable Method for the Ordered Attachment of Proteins to Surfaces	\$233570
05-LW-027	High-Pressure Multi-Mbar Conductivity Experiments on Hydrogen: The Quest for Solid Metallic Hydrogen	\$212931
05-LW-040	Molecular Transport in One-Dimensional Lipid Bilayers: A Biological "Smoke Alarm"	\$227538
05-SI-003	Biological Imaging with Fourth-Generation Light Sources	\$2415156
05-SI-005	Target Fabrication Science and Technology: An Enabling Strategic Initiative	\$2707574
06-ERD-002	Nonclassical Noise Reduction for Sensing Applications	\$136025
06-ERD-004	Development of Computational Techniques for Decoding the Language of Genomes	\$124016
06-ERD-005	Critical Materials Issues for Generation IV Reactors	\$476569
06-ERD-007	Time Resolved Phase Transitions via Dynamic Transmission Electron Microscopy	\$362254
06-ERD-009	Scalable Data Management for Massive Semantic Graphs	\$401754
06-ERD-010	The Physics of Recombining Plasmas in Celestial Sources	\$340323
06-ERD-012	Conversion of Plutonium and Enriched Uranium	\$516954
06-ERD-013	Biophysical Characterization of Pathogen Invasion	\$225072
06-ERD-014	Separation of Carbon Dioxide from Flue Gas Using Ion Pumping	\$172490
06-ERD-017	Laser-Driven Dynamic Hohlräume	\$258519
06-ERD-024	High Resolution Measurements of the Plasma Current Profile for ITER	\$276720
06-ERD-026	Urban Atmospheric Turbulence: Improved Turbulence Closure Models through Observations and Simulations	\$248733
06-ERD-027	Investigating New Regimes of Material Strength at Ultrahigh Strain Rates and Pressures	\$418432
06-ERD-031	Atmospheric ¹⁴ CO ₂ Constraints on and Modeling of Net Carbon Fluxes	\$187523
06-ERD-033	Understanding and Improving High Voltage Vacuum Insulators for Microsecond Pulses	\$498845
06-ERD-035	Fundamental Investigation of Laser-Induced Surface Damage in Optical Materials	\$634864
06-ERD-036	A Predictive Model of Fragmentation using Adaptive Mesh Refinement and Hierarchical Material Model	\$667554

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
06-ERD-037	Long Time Scale Shock Dynamics of Reactive Materials	\$140901
06-ERD-038	Decomposition of Large Scale Semantic Graphs via an Efficient Communities Algorithm	\$344541
06-ERD-039	The Properties of Confined Water and Fluid Flow at the Nanoscale	\$500454
06-ERD-040	Thermal-Fluidic System for Manipulating Biomolecules and Viruses	\$180084
06-ERD-042	Spheromak Energy Transport Studies via Neutral Beam Injection	\$330120
06-ERD-045	Heavy Quark Jet Tomography of Compressed Nuclear Matter	\$346157
06-ERD-047	Image Relational Search Engine	\$157986
06-ERD-051	Development of Single Cell Raman Spectroscopy for Cancer Screening and Therapy Monitoring	\$410556
06-ERD-053	Foam-Walled Hohlräume for Increased X-Ray Conversion Efficiency	\$229126
06-ERD-054	Large Aperture Optics Performance	\$1759316
06-ERD-055	Mitigation of Electromagnetic Pulse Effects from Short-Pulse Lasers and Fusion Neutrons	\$733692
06-ERD-056	Laser Beam Propagation in High-Temperature Plasmas	\$819302
06-ERD-057	Francisella Tularensis: Understanding the Host-Pathogen Interaction	\$469663
06-ERD-058	Data Intensive Computing	\$567426
06-ERD-059	A Novel Structure-Driven Approach to Sequence Pattern Definition for Remote Homology Detection	\$519369
06-ERD-060	Multi-Petabyte Image Data Management Systems	\$558236
06-ERD-061	Characterization and Quantification of Dynamic Robustness in Biological Systems	\$247032
06-ERD-063	Redox Proteins in Environmentally Relevant Bacteria	\$260475
06-ERD-064	Viral Identification and Characterization Initiative (VICI)	\$665763
06-ERD-065	Compact, High-Intensity Neutron Source Driven by Pyroelectric Crystals	\$162500
06-ERD-066	Regional Climate	\$147875
06-ERD-067	Study of Transport Behavior and Conversion Efficiency in Pillar Structured Neutron Detectors	\$273191
06-ERD-069	A Coupled, Multi-Physics Code for Accurate Modeling of Nuclear Reactors	\$54886
06-ERI-001	Development of Integrated Microanalysis of Nanomaterials	\$581582
06-ERI-002	The Chemistry of Core Formation	\$237907

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
06-ERI-004	Modeling the Mechano-Chemistry of NTPases	\$104291
06-ERI-005	Evidence for Stratospheric Downwelling Associated with High-Elevation Topography	\$53878
06-FS-007	Single-Cell Chromatography	\$102025
06-FS-008	Dielectric Properties of Oil Shale	\$100622
06-FS-009	Thermal Diffusivity and Conductivity Measurements in Diamond Anvil Cells	\$86719
06-FS-011	Feasibility Study for Large Water-Based Neutron and Neutrino Detection	\$84594
06-FS-014	Feasibility of Gratings for Increasing Solid-State Laser Gain and Efficiency	\$83915
06-FS-015	Enhanced Efficiency Chip Slapper for Detonator Applications using a Metal Hydride as a Solid-State Gas Gun	\$58584
06-LW-013	Nuclear Physics the Monte Carlo Way	\$142715
06-LW-019	Quantification of DNA Repair using Accelerator Mass Spectrometry	\$154292
06-LW-023	Developing A New Accelerator Mass Spectrometry Assay for Quantitation of PlatinumDNA Adducts for Response to Platinum-Based Chemotherapy	\$227268
06-LW-024	Quantum Monte Carlo Assessment of the Relevance of Electronic Correlations in Defects and EOS in Metals	\$263946
06-LW-028	Diffusion Monte Carlo without all the Hops	\$232333
06-LW-051	Biologically-Driven Fabrication of Complex Nanostructures at Nanoscale Chemical Templates	\$223063
06-LW-063	Observation of Coherent THz Frequency Emission from Shocked Polarizable Materials	\$194117
06-LW-064	Analysis of the Mucin Membrane Protein by Cryo-Electron Microscopy and Computational Image Processing	\$215919
06-LW-090	Understanding Shape Control in Nanoparticle Synthesis	\$219696
06-LW-093	Real-Time, Ellipsometry-Based Transmission Ultrasound Imaging	\$226610
06-SI-001	Novel High-Energy-Density Source	\$2159938
06-SI-002	Active Detection and Imaging of Nuclear Materials with High-Brightness Gamma Rays	\$2279810
06-SI-003	Developing and Integrating Novel Technologies for the Production and Characterization of Membrane Proteins	\$1940280
06-SI-004	The Ultrafast Lattice Response of the Shocked Solid	\$1269659
06-SI-005	Transformational Materials Initiative	\$3424147
06-SI-006	Predictive Knowledge Systems for Large Complex Data Sources	\$2166686

**United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006**

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
Total # of Projects for LLNL:	188	Total Cost for LLNL: \$92597273

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

NTS - Nevada Test Site

Project ID	Project Name	FY Total
H1701016	Line VISAR for curved surfaces	\$37601
H1701026	Coded aperture imaging for location of nuclear materials	\$115257
H1701036	Detector modeling capability	\$138156
H1701056	Diagnostic Shock Source	\$163417
H1701085	Development of a Multichannel Velocity Interferometer Optical Probe	\$6307
H1701086	Mach-Zehnder Velocimeter	\$142344
H1701096	Monte Carol simulation of high-speed, gated X-ray detectors	\$171677
H1701116	Novel fiber array diagnostic geometry	\$178165
H1701156	Slapper simulator	\$92878
H1701165	Streak pyrometer	\$779
H1701176	Stereoscopic borescope	\$128646
H1701196	Time frequency analysis	\$90374
H1702016	Spatial light modulators for dynamic spatial laser profiling	\$120373
H1702026	High radiographic output flat-field light source	\$170664
H1702036	Wide range (20-500 nsec) streak sweep circuits	\$177097
H1702066	Parallel pulse-height X-ray spectrometer	\$115457
H1702096	Applications of Si Nanowire CNT to phototubes	\$127677
H1702105	High-efficiency, low energy x-ray source	\$637
H1702106	Construction of a prototype TW streaking system	\$52313
H1702116	Disposable X-ray diode for fusion shots	\$69711
H1702125	CMOS x-ray color camera	\$10350
H1702135	Ultra-high speed, long-data-length transient recorder	\$2558
H1702145	Versatile, higher-demension x-ray imager	\$1031
H1702146	Framing tube performance upgrades	\$80617
H1702156	Streak tube performance limits	\$59326
H1702176	Nano-material enhanced compact X-ray sources	\$152868
H1702186	Versatile, high dimension X-ray imager	\$140266
H1703016	Single pulse detection of infrared sychrotron light	\$111351
H1703046	Silver chalcogenides: Unique megagauss field sensors	\$49042

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

NTS - Nevada Test Site

Project ID	Project Name	FY Total
H1703085	DOE test complex universal trigger distribution system	\$230
H1703106	Neutron monochrometer	\$129547
H1703126	Dense plasma focus computer modeling	\$49381
H1703135	Optical transducer development for UGT testing	\$2178
H1703136	Superheader	\$114492
H1703156	Anode pre-ionizing systems	\$46255
H1703186	Dynamic plasma properties via spectrometry	\$154918
H1703196	Atomic vapor generator	\$72383
H1703205	Extension of HOT/very HOT tube	\$2582
H1703215	Variable temperature/flow-rate stack for fugitive releases	\$3883
H1704016	Aerial neutron detection	\$117166
H1704066	High resolution gamma spectroscopy with cerium bromide	\$76294
H1704125	A tagged photon source for energy-dependent radiography	\$2924
H1704126	Micro reticulated plates for neutron source imaging	\$136770
H1704146	Prototyping search software with multiple algorithm options	\$81955
H1704155	Small Compton-suppressed gamma detectors	\$14
H1704166	Quantum wire detection	\$59673
H1704226	Simple wheeled dead-reckoning system	\$55720
H1704234	Micro-portal gamma/neutron monitor with cellular network	\$952
H1704235	Development of Microchannel Plate - Microsphere Plate Detectors to measure gammas & neutrons	\$21866
H1704246	Tagged Photon source for energy-dependent Radiography - Part II	\$98280
H1704256	Urban localized position system	\$35127
H1704425	Investigation of field effects on neutron detection	\$940
H1705026	Resonance shadowgraphy	\$84210
H1705036	Fluorescence calibration	\$47256
H1705076	Li-6 and B-10 polymer materials for neutron detection	\$161449
H1705086	Reactive optical deffractive materials for nerve agent detection	\$111255
H1705116	Multi-scale entropy extraction for weak signals	\$99679

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

NTS - Nevada Test Site

Project ID	Project Name	FY Total
H1705126	Portable X-ray spot size diagnostic	\$91385
H1705136	Displacement interferometry system	\$173383
H1705146	Multi-layer solid state silicon neutron detector	\$204160
H1705216	Quadrature optical modulator	\$85199
H1705225	Polymerized crystalline colloid arrays for sensing nerve agents	\$507
H1705226	Electro-optic differentiator	\$79047
H1705256	Pyroelectric crystal neutron source	\$73767
H1705265	Solid State Ultraviolet Laser Diode	\$25000
H1705336	Large format phosphor imager	\$100519
H1705366	Inexpensive passive neutron detectors for shipping containers	\$76352
Total # of Projects for NTS:	67	Total Cost for NTS: \$5383637

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3210-2121	Creation of Photosystem II Designer Alga for Hydrogen Production	\$24942
3210-2137	Chemical Vapor Deposition-Based Combinatorial Chemistry for New Hydrogen Storage Materials	\$57574
3210-2140	No-Moving-Parts Pump and Preconcentrator	\$32073
3210-2141	Three-Dimensional Imaging of Multiple Fluorophores	\$40059
3210-2142	Alzheimer's Disease Detection via Nonlinear Analysis of EEG	\$38765
3210-2143	Nano/Microelectromechanical Systems Tools for Retinal Surgery	\$35360
3210-2144	Metabolic Profiling of Phosphorylated and Coenzyme-Bound Metabolites Using Pressure-Assisted Capillary Electrophoresis Mass Spectrometry	\$64872
3210-2145	Fundamental Growth Mechanisms of Metal Nanoparticle-Carbon Nanotube Nanocomposite Materials	\$32316
3210-2146	Detecting Concealed Nuclear Materials with Photofission	\$19500
3210-2147	Integrating Hydrologic and Economic Data for Water-Energy Nexus Assessment	\$58128
3210-2149	Coupled-Cluster Theory with Effective Three-Body Forces	\$84429
3210-2150	Excited-State Quantum-Classical Molecular Dynamics	\$75714
3210-2153	Ionic Liquids as Novel Lubricants	\$84362
3210-2154	Exploring New Pathways in the Impact of Aerosols on Terrestrial Carbon and Hydrological Cycles	\$79874
3210-2158	Modeling and Computational Platform for Architecture Design of Phase-Locked, High-Power Semiconductor Laser Arrays	\$64318
3210-2159	Large-Area, Flexible, Heteroepitaxial, Single-Crystal-Like Diamond Films on Low-Cost Substrates for Wide-Ranging Electronic Applications	\$101932
3210-2160	Development of Readout Electronics for the ALICE Electromagnetic Calorimeter	\$116946
3210-2163	Orientalional Imaging in Biological Systems by Electromechanical Scanning Probe Microscopy: Galvani Experiment on the Nanoscale	\$117179
3210-2164	Development of an Intermediate-Temperature Solid Oxide Fuel Cell	\$92982
3210-2165	Sensing Arrays Based on Non-Nernstian Sensing Elements	\$118584
3210-2166	Multivariate Dependence in Climate Extremes	\$103716
3210-2167	Out-Of-Autoclave Stabilization/Carbonization of Pitch-Based Carbon-Carbon Composites and Other Pitch Materials	\$57790
3210-2168	Effect of Texture on High-Temperature Deformation in Nb-1%Zr Alloy	\$67307
3210-2171	Lead-Free Electromechanical Transducer Materials	\$99271

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3210-2172	Thermoelectric Properties of Uranium Dioxide	\$15988
3210-2173	Preliminary Study of Phosphor-Based Tracer Rounds	\$4999
3210-2174	Scalable Surface Enhanced Raman Spectroscopy for Single-Molecule Detection and Characterization	\$118287
3210-2175	Cesiated Carbon Nanoflakes Field-Emitter-Array Infrared Imager: A New Concept for Fast, Sensitive, and Inexpensive Microbolometric Infrared Cameras	\$97075
3210-2176	Estimating Economic Impacts due to Service Interruptions in Transportation Systems	\$65592
3210-2177	Development of a Revolutionary Solar Neutrino Detector	\$161558
3210-2178	Non-Contact Ultrasonic Treatment of Metals in a Magnetic Field	\$124960
3210-2179	Smart Tunneling Barriers: A New Concept for Ferroelectric-Based Nonvolatile Random Access Memory	\$81747
3210-2180	Participation in the National Institute of Standards and Technology Iris Challenge Evaluation: Algorithms for Improving Iris Recognition	\$162474
3210-2181	Identification of Protein-DNA and Protein-Protein Interactions in Single Living Cells Using Optical Nanosensors	\$129970
3210-2182	Preliminary Investigation of Medical Image Registration Using Deformable Models	\$25961
3210-2183	Characterizing Graphite Foam for Use in Electromagnetic and Acoustic Shielding	\$26146
3210-2184	A Proposed Material for Use in Combat Identification for the Department of Defense	\$20127
3210-2185	Discrete Event-Based Simulation of Electromagnetic Wave Propagation in Highly Cluttered Environments	\$116982
3210-2186	In Situ, Three-Dimensional Thermal Mapping Using Colliding-Pulse, Two-Photon, Induced Luminescence	\$120136
3210-2187	Generation of Mouse Embryonic Stem Cell Lines to Study Micro-RNA Functions through Conditional and Tissue-Specific shRNA Knockdown Approaches	\$104019
3210-2188	Hybrid Spread-Spectrum Sensor Telemetry, Tracking, and Information System	\$162024
3210-2189	Quasi-Electrostatic Carbon Orientation Processing for Lithium Ion Battery Anodes and Other Applications	\$77033
3210-2190	Development of ZnO Light-Emitting Diodes Using Pulse Thermal Processing	\$19420
3210-2191	Novel High-Resolution Micromechanical Gyroscope	\$129991
3210-2192	Big Bang Cosmology and Online Simulation Suite	\$110076

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3210-2193	Demonstration of Intra-Reactor Diagnostics for Catalytic Fuel Reformers	\$88659
3210-2194	Optical Monitoring of Delivery Methods for Therapeutic Agents to Neural Tissues	\$69636
3210-2195	A Genomic Analysis of Microbial-Mediated Metal Transformation	\$85955
3210-2196	Exploring Layered Materials with Neutron and Photon Spectroscopy to Determine the Depth and Water Content in Subsurface Layers of Planets	\$52159
3210-2197	Multivariate Statistical Analysis Technique to Locate Ecological Observation Sites within Regional Landscapes	\$12855
3210-2198	Determining Relative Value of Ecosystem Services	\$52912
3210-2199	Selective Electrochemical Oxidation of Water for Treatment of Ischemic Diseases and Other Applications	\$55357
3210-2200	A Novel Radio-Luminescent Glass for Safe User Applications	\$22090
3210-2201	Effects of Groundwater Chemistry on the Distribution of Soil Microorganisms in Natural Media	\$33662
3210-2203	Microstructure and Defects in Energetic Materials and Radioactive Alloys	\$56463
3210-2204	Establishing a Targeted Mutagenesis System in Clostridium cellulolyticum	\$5185
3210-2205	Carbonate Thermochemical Cycle for the Production of Hydrogen	\$18103
3210-2206	Novel, Low-Cost, High-Mn-Containing Austenitic Stainless Steels and Alloys for High-Temperature Structural Applications	\$30792
3210-2207	Laser Interference Direct Structuring of Zirconia for Dental Materials	\$10234
3210-2208	Characterization of a Potentially New Si:TiO2 Nanocrystal	\$20031
3210-2209	High-Resolution WoodCAT Data Collection and Analysis	\$22577
3211-2100	H- Laser Stripping Proof-of-Principle Experiment for the Spallation Neutron Source Power Upgrade Proposal	\$129864
3211-2110	Advanced Plasmonic Sensor Array for Homeland Security	\$130000
3211-2112	Photonic Bandgap Crystal Sensor	\$65705
3211-2115	Neutron Reflectometry Studies of the Structure of Polyelectrolyte Thin Films Subject to Shear	\$288689
3211-2116	Small-Angle Neutron Scattering Investigation of the Mechanism and Kinetics of Membrane Protein Crystallization in Self-Assembled Surfactant Mesophases	\$103284
3211-2117	Applications of Ultrafast, Ultra-Intense Lasers to Radioactive Ion Beam Production and Diagnostics	\$324426
3211-2118	Nanostructured Superhydrophobic Materials	\$685725

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3211-2119	Real-Time, Interconnection-Wide, Power System Analysis and Visualization	\$324935
3211-2120	Multiscale Mathematics on Massively Parallel Computers: New Tools for Computational End-Stations on the Cray X1E, Red-Storm, and the IBM Blue Gene	\$241241
3211-2121	Exploring Alternative Technologies for Next-Generation Leadership-Class Computing	\$378311
3211-2122	A Chemistry End-Station for the Large-Scale Computing Facility: Chemical Catalysis at the Nanoscale	\$301344
3211-2123	Computational Mechanics End-Station: Parallel Implementation of Finite Element Software on Ultrascale Computers and Its Application on Modeling Human Joints	\$324304
3211-2124	A Novel Thermomechanical Process for Producing Fe-3% Si Magnetic Steel Sheet for Transformers	\$329165
3211-2125	Advanced Network Capabilities for Terascale Computations on Leadership-Class Computers	\$207528
3211-2126	Computational Modeling of Alloy Deformation Based on a Novel Statistical Mechanics Approach	\$193686
3211-2127	Toward Systematic Computational Instrumentation for Nanoscale, Condensed Matter, and Materials Science	\$328961
3211-2128	Reliability, Availability, and Serviceability for Terascale Computing	\$359751
3211-2129	Terascale Computations of Multiscale Magnetohydrodynamics for Fusion Plasmas	\$389953
3211-2130	In-Situ, Time-Resolved, Neutron Diffraction Study of Materials Behavior Under Severe Thermomechanical Deformation	\$314217
3211-2131	Development of Lightweight Lead-Acid Batteries	\$312342
3211-2132	Effects of Confinement on the Statistical Physics of Nanoparticles -- From Idealized Models to Real Materials: Application to Antiferromagnetic Oxides	\$259827
3211-2133	Advanced Overhead Transmission Conductors	\$194770
3211-2134	An Integrated Experimental and Modeling Approach for the Study of Microbial Biofilm Communities	\$331287
3211-2135	Inhalation Exposure to Processed Nanoparticles: Exploring Nanotechnology and Biological Links	\$303290
3211-2136	A Deuteration Facility for In Vivo H-D Isotopic Labeling of Biological Macromolecules for Neutron Structural Biology and Soft Matter Science	\$273125
3211-2137	Radioimmunotherapy Using Oxide Nanoparticles: Radionuclide Containment and Mitigation of Normal Tissue Toxicity	\$275892

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3211-2138	Petascale Computation in Condensed Matter Physics	\$240814
3211-2139	Interfacial Solids: Functionality from Atomic-Scale Charge Transfer at Stacked Interfaces	\$195325
3211-2140	Confocal Scanning Transmission Electron Microscopy for Three-Dimensional Atomic-Resolution In-Situ Imaging	\$259816
3211-2141	A Systems-Biology Framework for Post-Genomic Microbiology	\$263764
3211-2142	Molecular and Cellular Imaging	\$311518
3211-2143	Imaging Molecules, Active Sites, and Reactions on Nanocatalysts	\$249318
3211-2145	Mass Spectrometry Beyond 100 Kilodalton: A New Generation of Mass Spectrometers to Solve a New Generation of Problems	\$258188
3211-2146	Fog Vortices with Electrospray Mass Spectrometry for Detection of Chemical and Biological Agents	\$214117
3211-2147	Deformation Mechanisms in Nanocrystalline Metals	\$253602
3211-2148	High-Resolution Imaging of Biological Samples in a Wet Environment	\$215428
3211-2149	Genome-Enabled Detection of Differential Mortality in a Northern Temperate Forest Ecosystem	\$188052
3211-2150	Optimization Studies for ISOL-Type High-Powered Targets	\$181876
3211-2154	Infrastructure Development for Neutron Scattering for Biomembranes and Biomimetic Membranes	\$299375
3211-2155	Synthesis and Neutron-Scattering Characterization of Ordered Self-Assembled Polymer Nanostructures and Bio-Membranes	\$258132
3211-2156	Biomass Ethanol from Clostridium thermocellum: Linking Bioprocessing with Systems Biology for Bioenergy	\$362573
3211-2157	A Model System for Analyzing Whole-Body Toxicity of TICs, TIMs, and Chemical Warfare Agents	\$209044
3211-2158	Systems Biology of the Mammalian Cilium: A Cellular Organelle Essential for Human Health and Development	\$271328
3211-2159	Taming Electronic Spins in Conjugated Polymers for Photovoltaic and Solid-State Lighting Applications	\$322568
3211-2160	Small-Angle Neutron Scattering Investigations and Computational Modeling of Creep Cavitation in Nanoparticle Strengthened Materials	\$353311
3211-2161	Accelerated Domestication in Populus: Harnessing the Recently Sequenced Genome for Bioenergy Crop Production	\$372933
3211-2162	Development of a Global Biogeochemistry Capability for Enhanced Climate Simulation and Earth System Modeling	\$117720

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3211-2163	Terascale Simulation Tools for Next-Generation Nuclear Energy Systems	\$385812
3211-2164	Novel Carbon Materials for Advanced Energy Storage	\$407672
3211-2165	Multi-Component Fuel Spray Simulation Tools for Alternative Fuel Formulations	\$455594
3211-2166	Nanocomposite Dielectrics: New Smart Materials for Electric Power Applications and the Advanced Grid	\$316258
3211-2167	Multiscale Modeling: Application to Hydrogen and Helium in Steel	\$267022
3211-2168	Exploring Performance Tools for Petascale Systems with Lightweight Compute Node Kernels	\$259908
3211-2169	Assuring Dynamic Power Grid Stability: Integrated Electric and Information Grid Modeling	\$419887
3211-2170	Automated Code Transformations in Support of Ultrascale Code Migration	\$324899
3211-2171	Nanocrystalline/Amorphous Silicon Thin-Film Composite for Stable, High-Efficiency, Photovoltaic Application	\$260291
3211-2172	Large-Scale Exploration of Protein Models for System Biology Applications	\$208905
3211-2173	Disentangling Soil Respiration Using Genomic Techniques	\$344472
3211-2174	Detection and Identification of Bacteria and Viruses Including Stealth and Genetically Modified Organisms	\$261312
3211-2175	Design and Synthesis of Novel Infrared-Active Nanophosphors	\$226896
3211-2176	Combustion of Nanostructured Metal Fuels: Towards Designing Optimized Combustion Chambers	\$199643
3211-2177	Time-Resolved Analysis of Microstructure in Advanced Materials Under High Magnetic Fields using Neutrons	\$303869
3211-2178	Enhanced Cognizance of Evolving Threat Situations via Knowledge Discovery from Disparate Data	\$389361
3211-2179	Probing the Boundary Between Imaging Microscopy and Spectroscopy: Toward the Exploration of Single Particles by Nuclear Magnetic Resonance Spectroscopy	\$278667
3211-2180	Photoregulated Peptide-Protein Interaction Systems for Bionanotechnology Applications	\$454135
3211-2181	Experimental Optimization of Advanced Stellarator Confinement	\$350799
3211-2182	Functional Analysis of the Role of MicroRNAs in Cancer	\$324052
3211-2183	Exploring Reconfigurable Computing Programming Models to Accelerate High-Performance Computing Applications	\$270789

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3211-2184	Theoretical and Computational Methodologies and Tools for Second-Generation Integrated Fusion Simulation	\$175407
3211-2185	Novel Approaches for Microbial Diversity and Strain Discovery for Bioenergy and Bioremediation	\$231953
3211-2186	Use of Small Angle Neutron Scattering to Study Complex Systems	\$3653
Total # of Projects for ORNL:	132	Total Cost for ORNL: \$24070908

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN03085/1748	Sonoluminescence Following Acoustically Driven Bubble Collapse	\$50247
PN04001/1760	A Toxigenomic Approach to Quantitative Structure-Activity Relationships Modeling	\$131368
PN04006/1765	Array Technologies for Quantification of Proteins	\$126479
PN04023/1782	Design and Demonstration of Integrated Biologically Based Risk Modeling Framework	\$75274
PN04031/1790	Fast, Two-Dimensional Gas-Phase Separations for Ultrahigh-Throughput Global Analyses	\$210965
PN04034/1793	Integrated Data Structures for Mapping Cellular Networks	\$193137
PN04040/1799	Mechanisms of Regulated Ligand Shedding	\$322933
PN04042/1801	Microcantilever-Based Sensing	\$69950
PN04047/1806	Network Inference Testbed	\$148894
PN04053/1812	Proteome and Bioenergetic Analysis of Growth States in a Syntrophic Co-Culture	\$313521
PN04055/1814	Proteomics of Membrane Protein Complexes Relating Calcium Signaling and Oxidative Stress	\$213295
PN04063/1822	Stimulus Controlled Catalysis	\$136653
PN04064/1823	Structural Characterization of Molecular Machines	\$61943
PN04068/1827	Toxicoproteomics-Based Core Analytic Capability for Chemical Toxicology and Environmental Sentinel Studies	\$62928
PN04069/1828	Transmodulation of Cellular Responses to Epithelial Cells	\$196399
PN05004/1832	A Novel Carbon Dioxide Capture Process Using Organometallic Clathrates	\$168586
PN05006/1834	Acid Dissolution in Water Clusters	\$68816
PN05008/1836	Analysis of Protein Function in Living Cells	\$275786
PN05010/1838	Bioinformatics Resource Manager	\$220797
PN05012/1840	Biophotolytic Production of Hydrogen from Water	\$182796
PN05013/1841	Biophysical Characterization of Membrane Proteins	\$163867
PN05014/1842	Biosensing Devices Based on Functionalized Nanomaterials	\$128612
PN05017/1845	Chemical Printing of Complex Electrode Structures	\$180264
PN05018/1846	Complex Queries	\$224531
PN05019/1847	Computational Biology and Bioinformatics Tools for Understanding the Role of Membrane Proteins in Diurnal and Circadian Processes of Prokaryotes	\$164990

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN05021/1849	Computational Tools for Proton Transport Through Complex Materials	\$109842
PN05022/1850	Controlled Cultivation, Molecular Biology, and Advanced Imaging of Microbial Biofilms	\$206046
PN05023/1851	Controlled Modification of Surfaces with Peptide Ions	\$93939
PN05024/1852	Crosstalk Between Receptor Signaling Pathways	\$214864
PN05025/1853	Systems Analysis of the Dynamics of Membrane Architecture, Composition, and Function -- Proteomic, Metabolomic, and Metallomic Characterization	\$283109
PN05026/1854	Cytochrome and Whole Cell Interactions With Iron Oxides	\$232559
PN05027/1855	Data Assimilation, Visualization, and Mining	\$175423
PN05028/1856	Data Integration and Pattern Recognition	\$220786
PN05029/1857	Desulfurization of Diesel Fuel by Selective Oxidation	\$73978
PN05031/1859	Detecting Biomarkers in High-Dimensional Data in the Presence of Unobserved Confounding Variables	\$90879
PN05032/1860	Detection-Directed Chemical Separations with Enhanced Tracer Infrastructure	\$246066
PN05034/1862	Discovery of a Biomarker Signature in Response to Nanoparticle Exposure	\$141885
PN05035/1863	Discovery of Novel Volatile Organic Metabolic Signatures for Early Immune Response or Inflammatory Conditions	\$159918
PN05037/1865	Early, Validated Biomarkers of Infectious Diseases in Humans	\$244278
PN05038/1866	Ecophysiological Investigation of Cyanobacteria using Controlled Cultivation	\$95112
PN05039/1867	Electrical Loads That Consume Non-Fundamental Electrical Power Pollution	\$93143
PN05041/1869	Enhanced Hydrogen Production Via Separation of CO2 from Gasified Coal	\$136674
PN05043/1871	Experimental Assessment of the Causes of Spectral Peak Broadening	\$179861
PN05044/1872	Formalized Materials Discovery for Radiation Materials	\$280222
PN05045/1873	Fundamental Investigations for Novel Acousto-Optics	\$133533
PN05046/1874	Fundamental Investigations of Heterogeneous Catalysis Using Steady-State Isotopic Transient Kinetic Analysis	\$420528
PN05047/1875	Fundamental Understanding of Catalytic Depolymerization of Cellulose	\$258492
PN05050/1878	High Throughput Screening of Protein Localization	\$338135
PN05052/1880	Identification of Cellular Markers of Response to Vaccination in Non-Human Primates as Correlates of Protection	\$128870
PN05053/1881	In Situ Probe of Oxidation at Environmental Interfaces	\$51024

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN05054/1882	Integrated Information Architectures	\$369522
PN05055/1883	Integrated Microbial Forensics	\$414819
PN05057/1885	Investigation of Novel Fieldable Platforms for Large Volume Air Collection	\$110655
PN05058/1886	Low Cost Small-Scale Hydrogen Production from Natural Gas	\$129335
PN05059/1887	Low Cost Hydrogen Permeation Barriers	\$32066
PN05060/1888	Magnetic Resonance Imaging for Understanding Water Management in Proton Exchange Membrane Fuel Cells	\$139789
PN05062/1890	Mixed Conducting Hydrogen Separation Membranes	\$134823
PN05063/1891	Model Nanoparticles for Discovery/Validation of Particulate Matter Biomarkers	\$95512
PN05064/1892	Modeling of Energy Transfer and Associated Variance in Gamma Ray Detector Materials	\$281234
PN05065/1893	Models and Measurements for Intrinsically Secure Computing	\$120697
PN05066/1894	Modular Architectural Advanced Technology Structures	\$90052
PN05067/1895	Molecular Modeling of Cytochromes, Surfaces, and Organisms	\$207821
PN05068/1896	Morphological, Functional and Redox Studies of Synechocystis 6803 and Cyanotheca 51135 Bacterial Membrane Complexes by Methods of Electron Microscopy	\$81778
PN05070/1898	Multiscale Modeling and Uncertainty Quantification for Bioremediation	\$196864
PN05071/1899	Mutagenesis and Functional Characterization of Shewanella oneidensis Genes Involved in Fe(III) and Mn(IV) Oxide Reduction	\$190005
PN05072/1900	Nanoparticles for Enhanced Biothreat Separation and Detection	\$187904
PN05074/1902	Noninvasive Biofilm Characterization Using Acoustic Microscope	\$222540
PN05075/1903	Non-Invasive Real-Time In Situ Spectroscopic Monitoring of Macrophage-Particulate Matter Interactions to Define Biological Pathways	\$121523
PN05077/1905	Ontology-Facilitated Extraction, Transfer, and Integration of Image-Derived Information	\$248418
PN05078/1906	Origins of Nonlinear Spectral Response in Semiconductor Radiation Detectors	\$174893
PN05079/1907	Overcoming Heterogeneity-Induced Bypassing in Subsurface Remediation by Mobility Controlled Flooding	\$100863
PN05080/1908	Particulate Matter Exposure and Respiratory Effects Biosignature Discovery	\$211536
PN05083/1911	Predictive Proteomics for Biosignature Discovery	\$119944

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN05084/1912	Probing the Dynamics of the Interacellular Membrane Systems of Synechocystis 6803 and Cyanotheca 51142 cells by Site-specific Near-Field Scanning Raman Microscopy and Fluorescence Lifetime Imaging Mi	\$25296
PN05085/1913	Purification and Biophysical Characterization of MR-1 Redox Proteins	\$248371
PN05086/1914	Radiation Detection Scenario Analysis	\$269802
PN05087/1915	Raising Computational Efficiencies of Massively Parallel Software	\$237872
PN05088/1916	Rapid Risk Assessment Integration and Feedback Research	\$137301
PN05090/1918	Retrospective Analysis of Access Grid Events	\$119928
PN05091/1919	Rfr-Domain Protein Family Characterization in Cyanotheca 51142	\$119632
PN05092/1920	Single-Pair FRET for Studying Molecular Interaction Dynamics Between Spatially Confined Proteins in the Living Cell	\$45165
PN05094/1922	Supporting Temporal Analysis Using Signatures for Scenarios	\$95510
PN05097/1925	The Dynamic Changes in the Molecular Interactions along the Circadian Rhythm	\$68183
PN05098/1926	Theoretical Assessment of the Causes of Spectral Peak Broadening	\$73516
PN05099/1927	Towards a Semantic Data Grid for Systems Science	\$205845
PN05101/1929	Unraveling the Molecular Biology of Host-Pathogen Interactions	\$167273
PN06001/1930	Accelerating Information Analytics Using High Performance Computing	\$286212
PN06002/1931	Advanced Explosives Detection Technologies	\$491070
PN06003/1932	Advanced Gasifier Modeling	\$113408
PN06004/1933	Advanced Particle Fuel Element Feasibility Study	\$342729
PN06005/1934	Advanced Ultrasonic Methodology for Enhanced Imaging and Material Property Measurements in Challenging Engineering Materials	\$179480
PN06006/1935	Advancement in Low-Background Radiation Detection Electronics and Pulse Shape Analysis	\$46864
PN06007/1936	Affinity Reagents Based on Novel Molecular Scaffolds	\$267958
PN06008/1937	Application of the Multiscale Modeling Framework to the Weather Research and Forecasting Regional Atmospheric Model	\$25458
PN06009/1938	Atomistic Simulations of Radiation Effects and Nanoscale Phenomena in Nuclear Fuels and Inert Matrices	\$32584
PN06010/1939	Biomaterials as Sequestering Agents for Radionuclides and Toxic Metals	\$120201
PN06011/1940	Bringing Water into an Integrated Assessment Framework	\$88481

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN06012/1941	Characteristic Ellipsoid Method for Monitoring Power System Dynamic Behavior Using Phasor Measurement Units Data	\$23193
PN06013/1942	Characterization of Ex-Vivo and In Vivo ¹ H-NMR Biosignatures of Respiratory Exposure to Model System	\$165270
PN06014/1943	Combinatorial Operando Catalyst Research	\$121334
PN06015/1944	Community-Based Biosignatures of Exposure and Functional Response in the Sediment-Water Interface of the Hyporheic Zone and Periphyton Community in River Systems	\$255640
PN06016/1945	Composite Analysis for Knowledge Signatures	\$248881
PN06017/1946	Controlled Template Synthesis of Tungsten Carbide as a Potential Replacement of Precious Metals and Carbon Support for Electrocatalysis	\$49804
PN06018/1947	Cooperative Assembly of Active Nanomaterials and Devices	\$107337
PN06019/1948	Data Intensive Machine Learning for Real-Time Decision Analysis	\$223576
PN06020/1949	Determination of Metabolic Pathways by Nuclear Magnetic Resonance Spectroscopy	\$112580
PN06021/1950	Developing an Efficient Biological Photovoltaic Fuel Cell	\$84461
PN06022/1951	Development of a Rapid Murine Igg Selection and Production Platform to Generate Reagents for Diagnostic and Detection Assays	\$123815
PN06023/1952	Development of a Scaleable Water Resources Management System	\$189265
PN06024/1953	Development of Fractured Media Multiphase Flow and Transport Model in STOMP	\$63955
PN06025/1954	Development of Microscopically-Based Models for Prediction of the Impact of Surface Grain Coating on Mineral Dissolution and Leaching Rates	\$306713
PN06026/1955	Development of Novel Measurement and Modeling Capabilities for Secondary Organic Aerosols	\$101521
PN06027/1956	Development of Rapid Bonding Techniques for Microchannel Reactors	\$33403
PN06028/1957	Dynamics and Spatial Expression of Signal Proteins in the <i>Desulfovibrio vulgaris</i> Biofilm and Its Implication to Iron Corrosion	\$186332
PN06029/1958	Effects of Soot Aerosol on Snow and Water Resource in the Western United States	\$54873
PN06030/1959	Electron Energy Loss in Radiation Detection	\$126045
PN06031/1960	Establishing the Long-Term Stability of an Argon-Cooled Compton-Shielded Germanium Spectrometer	\$100076
PN06032/1961	Evaluating Multithreaded Architectures for Irregular Data Intensive Applications	\$248895

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN06033/1962	Fuel Chemistry Relationship to Fuel System Wear	\$57963
PN06034/1963	Functional Genomic Analysis of the Regulation of Bone Cells by a Bioactive Lipid	\$327447
PN06035/1964	Functional Nanostructured Taggants	\$170214
PN06036/1965	Fundamental Investigations of Heterogeneous Catalysis Using Computational Methods	\$119816
PN06037/1966	Hierarchical Decomposition and Inverse Modeling for Multiphysics Simulation	\$199223
PN06038/1967	High Throughput Isolation of Organelles	\$253046
PN06039/1968	Host Pathogen Interaction of Salmonella typhimurium and a Bovine Model System	\$12886
PN06040/1969	Hybrid Algorithms for Networked Systems Analysis	\$164599
PN06041/1970	Hydriding to Improve Friction Stir Welding of Titanium Alloys	\$23928
PN06042/1971	Identification of Proteomic Profiles and Biosignatures in Complex Microbial Systems Absent of Genomic Sequence Data	\$95636
PN06043/1972	In Vivo Molecular Imaging Using Ultra-Slow Magic Angle Spinning Nuclear Magnetic Resonance	\$59012
PN06044/1973	Information Physics Methods and Applications	\$422173
PN06045/1974	Integrated Demonstrations of Biological Workflows to Support Threat Detection and Biomarker Discovery	\$328752
PN06046/1975	Interactive Interfacial Catalysis	\$72923
PN06047/1976	Interrogation of Glucose Metabolism by Oral Biofilms Using Combined Nuclear Magnetic Resonance/Optical Spectroscopy and Stable Isotope Labeling	\$327670
PN06048/1977	Investigation of Parallel Computing in Independent Component Analysis of Real-Time Remote Sensing Applications	\$183506
PN06049/1978	Liquid Core Optical Waveguide Detection on a Bioassay Column	\$143926
PN06050/1979	Metabolomics Measurement and Validation Development for Renewable Energy Research	\$105038
PN06051/1980	Monitoring the Condition of Migrating Salmonids with DNA Microarrays	\$37472
PN06052/1981	Multiscale Computational Model of the Heart to Predict Airborne Particulate Matter Cardiovascular Disease	\$86476
PN06053/1982	Nanoporous Metal Phosphates as Sorbents for Metals and Radionuclides	\$45083
PN06054/1983	Nanoscale Characterization of Nanomaterial-Cell Membrane Interactions	\$117805
PN06055/1984	Nanostructured Catalyst Synthesis and Applications	\$439409

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN06056/1985	Nanostructured Heterogeneous Photocatalysts	\$257016
PN06057/1986	Near Real-Time Situation Awareness from Massive Sensor Data	\$219094
PN06058/1987	Ni-Based Molecular Electrocatalysts for Hydrogen Production/Oxidation	\$158481
PN06059/1988	Non-Precious Metal Based Catalysts for Polymer Electrolyte Membrane Fuel Cells: Ternary Transition-Metal Nitrides	\$71967
PN06060/1989	Novel Chemical Extraction Based on Integration of Microtechnology with Functional Multiscale Materials: Radiochemical Separations and Monitoring of Municipal Water Supplies	\$94215
PN06061/1990	Power Grid Monitoring and Alerting System	\$94439
PN06062/1991	Power Systems Computational Advancements	\$216337
PN06063/1992	Preparation and Characterization of Peptide Arrays Using Soft Landing	\$111632
PN06064/1993	Probabilistic Design and Optimization of Advanced Thermoelectric/Piezoelectric Systems	\$113403
PN06065/1994	Protein-Protein Interaction Network Prediction	\$93018
PN06066/1995	Quantitative Characterization of Post-Translational Protein Modifications Using Mass Spectrometry	\$222922
PN06067/1996	Radiological Forensics	\$411504
PN06068/1997	Regulation of Cell Surface Ligand Dynamics	\$307071
PN06069/1998	Response of Radiation Detector Materials to Ions	\$114120
PN06070/1999	Secretome Analysis of Nanomaterial Induced Biomarkers	\$118228
PN06071/2000	Selective Heterogeneous Catalysts	\$105431
PN06072/2001	Sensor Platforms for Biomarkers of Response to Biological Agents - Immuno-PCR Bead Assays for Detecting Early Biomarkers	\$58210
PN06073/2002	Sensor Platforms for Biomarkers of Response to Biological Agents - Nanoparticle Immunoassays for Detecting Protein Biomarkers	\$72618
PN06074/2003	Signal Analysis for Nuclear Resonance Fluorescence	\$55770
PN06075/2004	Signatures of Oxidative Stress Associated with Inhaled Particulate Matter	\$167218
PN06076/2005	Simultaneous Monitoring of Multiple Variables in Signal Transduction Pathways	\$239949
PN06077/2006	Single Enzyme Nanoparticles for Biofuel Cells	\$108235
PN06078/2007	Synthesis and Characterization of Thin Films for Rapidly Screening Detector Materials	\$292846

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN06079/2008	Synthesis, Structure, and Properties of a Novel Family of Pillared Doped-Graphite Materials	\$61942
PN06080/2009	The Tree-of-Life Chip for Examination of Ecosystem Structure and Function	\$70417
PN06081/2010	Trace-Level Threat Detection Device	\$74358
PN06082/2011	Type III Secretion Systems and Their Roles in Bacterial Virulence Process	\$195127
PN06083/2012	Using Subtractive Hybridization to Identify Biosignatures of Perturbed Microbial Communities	\$63018
PN06084/2013	Validation of Biomarkers that Transcend Individual Genetic Polymorphisms: Application to Radio-Protectant Therapies	\$77335
PN06085/2014	Visualizing Heterogeneous Data for Improved Network Security	\$93100
Total # of Projects for PNNL:	171	Total Cost for PNNL: \$27552922

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

PTX - Pantex Plant

Project ID	Project Name	FY Total
PX03002	Enhanced Analysis Capability Supporting Accelerated Aging Studies	\$62271
PX03004	Formation and Detection of Pores in Polymeric Materials	\$227167
PX03008	Neutron Non-Destructive Imaging of Weapons Materials	\$71645
PX04003	Characterization of Corrosion Mechanisms	\$143141
PX04005	Advanced Radiation Alarm Monitoring System (ARAMS)	\$12719
PX04008	Pilot Plant Solids Addition Capability	\$45660
PX04012	Fiber Optic Probe Development for Laser Spectroscopy	\$42650
PX04015	Pilot LABSOSC System Evaluation & Application for Specific Gamma Spectrometry	\$5085
PX04029	Supercritical Fluid Extraction of DMF from HNS	\$46512
PX05001	Development of A Method to Melt/Disfigure (Sanitize) Weapon Components Using Microwave Technology	\$433639
PX05006	Measurement of Physical Constants for Various Crystalline High Explosives	\$73565
PX06001	Utilization of Blackberry Technology Inside the Security Fence	\$5714
PX06005	Spectroscopic and Infrared Imaging Studies of Pressing Effects on Explosives	\$80361
PX06006	Evaluation of Non-Equipotential Floors	\$55475
PX06007	Desktop Virtual Reality Training System	\$102537
PX06010	Mechanical Impact Sensitivity of Uncased HE on Actual Work Area Floor Covering	\$131583
PX06011	Precision Control of Agglomeration and Coating of Explosive Powders	\$41370
PX06014	Breached Pit Vessel	\$37411
Total # of Projects for PTX:	18	Total Cost for PTX: \$1618505

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
100327	MEMS Core Design for iSMART	\$251045
100337	Decision Support System Development Using Agent-Based Modeling	\$552692
100736	Machine Perspicacity Feasibility Study	\$97577
100738	Back-End Verification of SOC Devices	\$386269
101118	Microsystem Miniaturization of High Frequency Systems	\$1140792
101297	Integrating Nano-Enabled Systems	\$368613
101817	LTD/RTL Power Flow Development for Z-Pinch Fusion Drivers	\$1260058
101931	Critical Advances in Cognitive Science and Technology: The Cognitive Collective and Cognitive Science and Technology Foundations	\$631146
102362	Z-Pinch Driven Fusion Systems for IFE, Transmutation, and GNEP	\$1289071
102593	Science Based Engineering of a Sample Preparation Device for Biological Agent Detection	\$366624
102597	RF MEMS Passive Demodulating Detector	\$86178
102599	Engineered Conjugated Molecule-Linked Metal Nanocrystal/Silica Arrays for Integrated Chemical Sensor Platforms	\$321786
102600	Nanoengineering for Solid State Lighting	\$460617
102602	Miniature Vibrational Energy Harvester: Improved Modeling & Simulation Through Experimental Validation	\$96727
102603	Model-Based Statistical Estimation of Sandia RF Ohmic Switch Dynamic Operation from Stroboscopic, X-ray Imaging	\$82077
102604	Integration of Nanoporous Materials into Device Structures via DEP-Directed Manipulation and Templated Self Assembly	\$372910
102605	Atomistic Simulations of Brittle Crack Growth	\$79730
102606	Integrated Machining and Assembly of MEMS-based Antenna	\$91107
102607	Neutrino Detection Technology Development	\$195639
102608	Understanding the Materials Physics for an Alternative for PZT 95/5	\$151489
102609	Optical Microswitching Foundations	\$641109
102610	New Processes for Innovative Microsystems Engineering with Predictive Simulation	\$86261
102612	Embedded Evaluation Sensor	\$300435
102613	Phase Imprint Lithography for Large Area 3D Nanostructures	\$453473

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
102615	Mid-Infrared Quantum Dot Emitters Utilizing Planar Photonic Crystal Technology	\$447621
102642	Global Optimization for Nanomaterials	\$332846
102659	Laser-Based Micro Forming and Assembly	\$266408
102660	Experimental and Theoretical Determination of Thermal Defect Generation on Silicon Surfaces for Control of Nanoscale Structures	\$95812
102661	Advanced Modeling and Simulation To Design and Manufacture High Performance and Reliability Advanced Microelectronics and Microsystems	\$470573
102662	RF/Microwave Properties and Applications of Directly Assembled Nanotubes and Nanowires	\$133579
102663	Quantum Dot Logic to Extend Moore's Law	\$295202
102737	Creation of Water-Treatment Membrane Technologies with Reduced Biofouling	\$464569
103004	Modeling and Simulation of Spectra Expected from Radiation Sensors Made from Arrays of MEMS Scale Capillaries	\$117810
103005	Ultrafast NanoLaser Device for Detecting Cancer in a Single Live Cell	\$168637
103006	The Nanoscience, Engineering, and Computation Institute at Sandia (NECIS)	\$1195135
103389	Virtual Security Design, Analysis, and Training Tool	\$71227
103390	Emergency Preparedness for Biological Attacks	\$97604
103392	Tunnel Detection	\$22798
103393	Heterogeneous Distributed Network Sensing Feasibility Study for Security Applications	\$82182
103394	A Method to Enable Complex New Software Missions	\$52104
103395	Automated Approach to Dealing with Hacker Attacks	\$100072
103396	Nano-Bio-Cogno Convergence Concept Design Study	\$95597
103459	Quasi Spherical Direct Drive Fusion	\$92469
103925	Cognitive Science and Technology Synergies Concept Design Study	\$71628
103926	Ultra-high Mobility 2D Electron Systems for Science and Technology	\$248581
104111	Controlled Synthesis of Nanocrystalline Catalysts - from Solutions to Supports	\$79625
104420	Enabling Ultra-Miniaturization of RF and High-Speed Digital Systems	\$173542
104421	Thermo-Optic Focal Plane Array (TO-FPA) for High Sensitivity Room Temperature Infrared Imaging	\$48805

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
104480	Enhancement of HPM Effects	\$134586
104511	Updating Time-to-Failure Distributions Based on Field Observations and Sensor Data	\$76954
104513	Run-Time Reusable Software Components	\$85880
104514	Radical Advancement in Multi-Spectral Imaging for Autonomous Vehicles (UAVs, UGVs, and UUVs) Using Active Compensation	\$96849
104574	Biodegradation of Hermetic Seals	\$41861
104576	Image Processing Software for Reverse Engineering Applications	\$57787
104577	Optimized Custom Knowledge Discovery	\$64591
104735	Neural Interface Evaluation	\$91108
104737	Foundations for Augmented Cognition Systems that use Nanoscale Materials	\$83201
104742	The Effects of Angry and Fearful Emotion States on Decision-Making	\$85767
104889	Active Resonant Subwavelength Grating for Scannerless Range Imaging Sensors	\$97577
104949	Hollow Waveguides for Instrumentation in Intense Radiation Environments	\$80583
104953	Nanoporous Films for Epitaxial Growth of Single Crystal Semiconductor Materials	\$87166
104955	A MEMS-based Thermoacoustic Engine	\$77332
104973	Development of Sample Preparation Methods for ChIPMA-based Imaging Mass Spectrometry of Tissue Samples	\$98639
104975	Development of Nanofluidic Devices for Dielectrophoretic Chromatographic Separation of Biomolecules	\$98127
104984	GNEP Technology Systems Study	\$100336
105067	Advanced Robot Locomotion	\$100337
105127	Enabling Technology for Shape Optimization of Armor and Other Defense Assets	\$106079
105185	Pareto Optimization Techniques	\$26275
105187	An Examination into the Chemical Properties of Supercritical Water	\$26275
105188	Data Collecting, Analysis, and Modeling to Better Understand Supercritical Water (SCW) Reactor Safety Technologies	\$26275
105189	Precise Distributed Control and State/Parameter Estimation for Multi-body Satellites and Satellite Formations	\$21020
105190	Modeling and Design of Microstructures with Tailored Adhesive Properties	\$26275

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
105191	Fourier Analysis and Synthesis Tomography	\$26275
105193	Neural Correlates of Attention and Intention in Decision-Making of Macaques and Humans: Selective Lesioning of Posterior Parietal Areas during Electrophysiology and fMRI	\$52550
105213	Application of Advanced Laser Diagnostics to Hypersonic Wind Tunnels and Combustion Systems	\$22000
105305	fMRI Analysis of the Decision Making Processes of Human Subjects	\$63957
105306	Investigating Surety Methodologies for Cognitive Systems	\$43452
105672	On the Role of Numerical Error in Turbulence Simulations	\$53855
105673	Systems Modeling and Analysis of Transportation Fuels	\$104431
105674	Biological Research Survey for the Efficient Conversion of Biomass to Biofuels	\$50546
105675	Discrimination of Signatures of Advanced Energetic Materials for the Modern Battlefield	\$66211
67004	Rapid Prototyping to the Nanometer Scale	\$409512
67005	Robust Manufacturing of Gel-based Components for Nuclear Weapons	\$127894
67007	Injection Molding of Net-Shape Active Ceramic Components	\$426712
67008	Macro-Meso-Microsystems Integration in LTCC	\$468281
67010	Studies of Signaling Domains in Model and Biological Membranes Through Advanced Imaging Techniques	\$397374
67012	Protein Microarrays for Biowarfare Agent Detection and Characterization	\$464031
67013	Interaction of Proteins with Lipid Films	\$329642
67014	New Technologies for Understanding Membrane Protein Recognition and Signaling	\$162293
67015	Massively Parallel Scalable Atmosphere Model	\$308216
67016	High Performance Processing Architecture	\$191722
67017	Substructured Multibody Molecular Dynamics	\$375517
67018	Enhancing Simulation Performance on Clusters with Configurable Auxiliary Devices	\$215833
67020	Penetrator Reliability Investigation and Design Exploration (PRIDE)	\$617474
67021	Topology Optimization for Improving Sensor Performance	\$253784
67022	Characterization and Application of Dielectrics with Controlled Leakage	\$292941
67023	Nano-g Accelerometers Using Nanophotonic Motion Detection System	\$507884

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
67024	Bragg Fiber Development	\$336600
67025	Microwave to Millimeter-wave Electrodynamic Response and RF Applications of Semiconductor Quantum Nanostructures	\$366104
67026	Development of GaN Power Amplifiers for SAR and Radar Fuze Applications	\$325033
67027	Evanescence Wave Planar Photonic Biosensor	\$356977
67028	Passive Electronically Steerable Array (PESA) for Miniature Synthetic Aperture Radar (miniSAR), Precision Guidance, and Intelligence/Surveillance/Reconnaissance (ISR)	\$369084
67032	Weaponization of Thermobaric Explosives	\$343689
67033	Development of an Enterprise-Scale Agent-Based Autonomic Logistics Simulation Model	\$286348
67035	Novel Processing, Affordable Motion Compensation, and Mode Multiplexing for Miniaturized Synthetic Aperture Radar	\$363777
67037	Enhanced Perception for Remote 3D Mapping of Unknown Indoor and Outdoor Environments	\$317229
67039	MICROFUZE Integration	\$400283
67041	Analysis of Technology Impacts on Operations in Complex Environments	\$360369
67047	Systems Analysis of Networked Sensors	\$279462
67048	Deployable Object Tracker for NMD Flights	\$210536
67052	Fully Integrated System Dynamics Toolbox for Water Resources Planning	\$343235
67053	Predicting System Performance of Proton-Exchange-Membrane Fuel Cells: Computational Modeling with Experimental Discovery and Validation	\$502648
67055	Silicon Field Emission Electric Propulsion Arrays (FEPA) Powered by Orbital Nuclear Reactors	\$519972
67056	Advanced Fuel-cell Reactor for the Direct Cogeneration of Electricity During Selective Partial Oxidation of Hydrocarbons	\$410683
67059	Membranes for H ₂ Generation from Nuclear Powered Thermochemical Cycles	\$300987
67061	Tunable Ion Conductors for Low Temperature Oxide-based Fuel Cells	\$196368
67064	Ray Model of High Frequency Cavity Scarring	\$192994
67067	Noncontact Surface Thermometry for Microsystems	\$329102
67068	High Speed Interferometric Deformation Measurements	\$283433
67069	Fundamentals of Nanofluidics	\$336864
67070	Simulating Self-assembly and Growth of Biological Nanostructured Materials	\$337570

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
67074	Electrochemically Switchable Materials for (Bio)Microfluidics	\$231753
67075	Modeling of Friction-Induced Deformation and Microstructure	\$565945
67076	Reversible Antibody Trapping for Selective Sensor Devices	\$170303
67077	Correlated and Comprehensive Analytical Techniques for Homeland Defense	\$520537
67078	Development of High Energy Density Dielectric Materials for Integrated Microsystems	\$364269
67079	Nanolithography Directed Materials Growth and Self-Assembly	\$396927
67080	Development of a Novel Technique to Assess the Vulnerability of Micro-Mechanical System Components to Environmentally Assisted Cracking	\$169415
67081	3D Optical Sectioning with a New Hyperspectral Deconvolution Fluorescence Imaging System	\$393848
67082	The Science of Solutes: Transition Metals in LIGA Nickel	\$284354
67083	Novel Gel-Based Technology for Sensors and Weapons	\$124517
67084	Coupled Nanomechanical Oscillator Arrays for the Study of Internal Dissipation in Nano-scale Structures and Collective Behavior in Large Systems	\$305542
67085	Precisely Controlled Picoliter Vessels with Rapid Sample Preparation for Trace Biotxin Detection	\$245343
67087	Infrastructural Development for Flexible Network of Devices	\$461498
67088	Monolithic Reconfigurable Radio-Frequency Microelectromechanical (RF MEMS) Antennas	\$381643
67090	Risk Assessment Meta Tool	\$121993
67096	Vulnerability Assessment with Dynamic Reverse Engineering of Embedded Processors through Innate Debug Mechanisms of System-on-Chip Integrated Circuits	\$265588
67098	Nonlinear Optical Detection of Biological and Chemical Aerosol Agents Using Femtosecond Lasers	\$481984
67099	Polymer Electronic Devices and Materials	\$273196
67114	Critical Infrastructure System of Systems Assessment Methodology	\$527979
67122	Embeddable Shock Physics Sensors	\$290144
69156	System Dynamics Modeling to Assist Regional Water Planning: Modeling the Non-Market Value of Water	\$25000
69157	Interactive Water Quality Modeling to Assist Regional Water Planning	\$25000

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
69166	Adaptive Algorithms for Use in the Rejection of Periodic Disturbances of Unknown Frequency	\$25000
69198	Poroelectric Wave Propagation Modeling and Inversion	\$309491
70799	Developing the Foundation for Polyoxo-niobate Chemistry: Highly Tunable and Exploitable Materials	\$290467
71943	Simulating Human Behavior for National Security	\$251897
73185	Superhydrophobic Surface Coatings for Microfluidics and MEMS	\$501357
73207	Micro Optical Radar (MOR) Facial Recognition Project	\$59847
75786	Maximally Autonomous Autodirective Antenna Array Technology	\$25000
78783	Generalized Continuum Models for Inelasticity in Solids: Formulation of Theories, and Variational Methods for Computation	\$52550
79738	Adaptable Software for Advanced Human/Computer Systems	\$363005
79741	Design and Manufacture of Complex Precision Optics	\$186552
79742	Development of a Manufacturing Capability for Production of Ceramic Laser Materials	\$350508
79745	Integrated Genome-Based Identification of Biological Agent Proteins: A Microfluidic Module for Nanosequencing of Proteins and Peptides	\$485130
79746	Tools for Characterizing Membrane Rafts and Toxin Interactions	\$179002
79747	Integrated Nanosystems for Monitoring Cell-Signaling Proteins	\$480883
79749	DNA-Based Intelligent Microsensors for Genetically Modified Organisms (GMO)	\$283974
79750	Reverse-time Seismic and Acoustic Wave Propagation: High-fidelity Subsurface Imaging and Location of Energy Sources	\$317276
79751	Multi-Spectral Detection of Microfluidic Separation Products	\$194824
79752	A Mathematical Framework for Multiscale Science and Engineering: The Variational Multiscale Method and Interscale Transfer Operators	\$412944
79753	Microprocessor Extensions to Accelerate Scientific Applications	\$244460
79754	Data Mining on Attributed Relationship Graphs	\$369225
79755	Multi-Physics Coupling for Robust Simulation	\$290847
79756	Simulation of Neutron Radiation Damage in Silicon Semiconductor Devices	\$343590
79757	Data Pipelining for Heterogeneous Data Fusion	\$284841
79759	Emergent Distributed Tracking and Identification from Features in Wireless Sensor Networks	\$373110

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
79760	Novel Photonic Crystal Cavities and Related Structures	\$208377
79761	Integrated NEMS and Optoelectronics for Sensor Applications	\$395809
79762	Development of Advanced UV Light Emitters and Biological Agent Detection Strategies	\$338406
79763	SMART Micro-Preconcentrator for Integrated Preconcentration and Detection of Chemical Agents and Explosives	\$374847
79764	Investigation of Liquid Jet Break-up and Dispersion	\$264884
79765	Accelerating DSMC Data Extraction	\$188139
79766	Modal Analysis of Almost-Linear Structures	\$461782
79767	Nano/Micro-Engineered Interfaces for Improved Performance and Reliability	\$289764
79768	Electromagnetic Modeling of Photonic Band Gap Laminates for Tailored Emission	\$248358
79771	Hydrodynamic Manipulation of Coalescence Dynamics	\$278973
79773	Atomic-Scale Modeling of Phonon-Mediated Thermal Transport in Microsystems	\$228563
79774	Multiphase Dynamics of Soft Biological Tissues	\$338959
79776	Nano-Scale Optical and Electrical Probes of Materials and Processes	\$101654
79777	Applying New Network Security Technologies to SCADA Systems	\$408958
79778	Use of Composite Materials to Refurbish Our Civil and Military Infrastructure	\$332881
79779	Desalination Utilizing Clathrate Hydrates	\$341351
79780	Development and Application of the Dynamic System Doctor to Nuclear Reactor Probabilistic Risk Assessments	\$239081
79781	Innovative Solar Thermochemical Water Splitting	\$445768
79798	System Analysis of Carbon Sequestration with Clean Coal Technology	\$117350
79800	MOCVD Synthesis of III-Nitride Heterostructure Nanowires for Solid-State Lighting	\$102545
79801	Novel System for Zero-Emission Electricity and Hydrogen Production from Coal and Biomass	\$313860
79803	Fuel Traps: Mapping Stability via Water Association	\$117597
79807	Risk-informed, Decision-making Methodologies for Robust Control of Complex Infrastructures	\$405986
79812	Universal Biosample Processor	\$229047

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
79813	Security-enabled Programmable Switch for Protection of Distributed Internetworked Computers	\$367950
79815	Automated Terrorist Threat Detection System	\$294058
79818	Development of Ultraminiaturized Photomultiplier Detectors	\$366329
79820	Portable Medical Diagnostic System for Detection of Presymptomatic Biomarkers of Chem/Bio-agent Exposure	\$388629
79821	Diatoms as Molecular Architects	\$394405
79823	Novel Mechanisms of Nanomechanical and Transmembrane Actuation	\$343302
79824	Carbon Nanotube Sorting via DNA-Directed Self-Assembly	\$400294
79825	Next-Generation Contact Materials for High-Reliability Microsystems Devices	\$433630
79826	Controlled Fabrication of Nanowire Sensors	\$403932
79827	Fundamental Enabling Issues in Nanotechnology: Stress at the Atomic Level	\$345760
79829	Adaptive, Peircean Based Decision Aid	\$306975
79831	Design Tools for Complex Dynamic Security Systems	\$404313
79832	Knowledge Discovery via Sensor Fusion in Structures and Ad-Hoc Networks	\$293353
79836	UGS Concept and Technology Development for Enhancing Boost Phase Detection ISR SDAC Application	\$238996
79838	Large-Area Metallic Photonic Lattices for Military Applications	\$280924
79839	Network and Adaptive System of Systems Analysis Methodology	\$373469
79843	Compensation of Ionospheric Errors for Geolocation	\$186160
79844	Single-Photon-Sensitive Imaging Detector Arrays	\$357983
79846	Fully-integrated Microfluidic Microthruster System For Micropropulsion Applications	\$443511
79847	Standoff Detection of Explosives Using UV LIDAR Technology	\$281153
79848	Fail-safe Infectious Substance Transport Packages	\$260957
79849	Development of Entomologic Surveillance to Aid Early Disease Detection (EDD)	\$83837
79850	Biological Risk Assessment Methodology (BioRAM)	\$168372
79852	Laser-Induced Breakdown Spectroscopy for Remote Explosives Detection	\$348953
79854	Discrete Field-Portable Identity Microarrays	\$348717
79856	Integrated Optical MEMS using Through-Wafer Vias & Bump-Bonding	\$366262

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
79859	Stressed Glass Technology for Actuators and Removable Barrier Applications	\$166880
79861	Terahertz Quantum Cascade Lasers for Standoff Molecule Detection	\$182126
79862	Advanced Technologies for National Security Applications	\$783855
79863	Forensic Tool Development for SCADA Systems	\$293345
79864	Verification Through Process Monitoring	\$271091
79865	High Operating Temperature LWIR Detectors for Advanced Infrared Imaging Systems	\$379027
79866	Tunable Dielectric Films for Frequency Agile RF and Microwave Integrated Circuits.	\$271162
79867	Micropolarizing Device for Long Wavelength Infrared Polarization Imaging	\$273856
79868	Next Generation High-Voltage Switches for Capacitive Discharge Firing Systems	\$226389
79869	Intelligent Fuzing for Hard Target Defeat	\$104143
79870	A New, Cost-Effective Solution to Provide Radiation-Hardened Materials for Nuclear Weapons	\$379669
79871	Micro- and Mesoscale Detonics of Explosives	\$289237
79874	Ion Neutron SIMulation - INSIM	\$255617
79875	A Miniaturized mW Thermoelectric Generator For NW Objectives: Continuous, Autonomous, Reliable Power For Decades	\$410686
79876	Advanced Material Applications of Precision-Deposited and Free-Form-Fabricated Energetic Materials	\$370908
79877	Characterizing the Emissivity of Materials Under Dynamic Compression	\$184347
79878	Beyond the Local Density Approximation: Improving Density Functional Theory for High Energy Density Physics Applications	\$340931
79880	Thermo-physical Properties of Shocked Water for Modeling Pulsed Power Switches and Other HEDP Systems	\$190250
79881	Triggered Low-Inductance Gas Switching	\$378361
79883	Achieving a New Paradigm in Software Technology	\$360080
79893	Cohesive Zone Modeling of Failure in Geomaterials: Formulation and Implementation of a Strong Discontinuity Model Incorporating the Effect of Slip Speed on Frictional Resistance	\$24000
80568	Development of Design and Simulation Models for Large-Scale Hydrogen Production Plant Using Nuclear Power	\$584537

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
80590	Reconciling System and Application Logs	\$25000
80591	Mobile Agent Abstractions, Methods, and Infrastructure for Efficient Sensor Network Tasking Over Heterogeneous Networks	\$25000
80592	Ultra-fast Low-voltage MEMS Switches for Optics and RF Applications	\$195184
80593	Catalyst Development and Micro Reformers for Fuel Processing	\$25000
80594	Catalytic Membrane Development for Micro-scale Glucose Reforming	\$25000
80595	Reliability of Materials in MEMS: Residual Stress and Adhesion in a Micro Power Generation System	\$25000
80596	Modeling River-Aquifer Interaction with Application to the Rio Grande	\$25000
80598	Kinetics and Mechanisms of Nanowire Synthesis	\$25000
80599	Rapid Chemical Analysis Using Micropower Gas Chromatographic Columns and Latching Microvalves	\$25000
80601	Automated Assembly of Micro-Scale Devices	\$52408
80602	MEMS Reconfigurable Intelligent RF Circuits	\$25000
80603	Bayesian Inference for Inverse Problems, Model Structure, and Uncertainties	\$206144
80604	Atomistic Modeling of Nanowires, Small-scale Fatigue Damage in Cast Magnesium, and Materials for MEMS	\$50000
80667	Design, Analysis and Control of MEMS Devices for Micromanipulation Tasks	\$25000
81752	Integrated Fiber Lasers for Efficient High-Power Generation	\$3942756
81753	Advanced Fusion Concepts: Neutrons for Testing and Energy	\$4157307
82854	Developing Novel Scaffolds for Biological Molecules by Solving the I-QSAR Problem Using the Signature Molecular Descriptor	\$50000
84266	Effective Dispersion of Nanoparticles by Polymers	\$233003
84267	Bead-based Multiplexed, Orthogonal, BW/ID (BioWarfare/Infectious Disease) Detection Microsystem and Technologies	\$348016
84270	Robust Spore-based Detection System	\$126044
84271	Terahertz Detectors for Long Wavelength Multi-Spectral Imaging	\$324931
84318	Electroforming of Bi(1-x)Sbx Nanowires for High Efficiency Micro-Thermoelectric Cooling Devices on a Chip	\$330029
84320	Advancement in Thermal Interface Materials for Future High-Performance Electronic Applications	\$338930
85512	File System Performance Optimization for Supercomputing Applications	\$25000

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
85513	MEMS-based Arrays of Micro Ion Traps for Quantum Simulation Scaling	\$106195
86358	Analysis of Bead Attached Ion Channels on Optically Addressable Micro-Fluidic Electrode Arrays	\$25000
86362	PCSS/Fiber-Optic Trigger System for Pulsed Power Switches	\$327555
86801	Capture and Utilization of Prosody in Disambiguating Spoken Speech	\$25000
89669	Diffusionless Fluid Transport and Routing Using Novel Microfluidic Devices	\$47393
90493	Exploiting Interfacial Water Properties for Desalination and Purification Applications	\$1057856
90497	Development of a Universal Fuel Processor	\$548563
90498	Emulsion Technology for Sample/Contaminant Collection	\$144177
90501	Rapid Updating of Stochastic Models Using Sensor Information	\$219226
90506	Bioagent Detection Using Miniaturized NMR	\$144340
90729	Analysis of Real-Time Reservoir Monitoring: Reservoirs, Strategies, & Modeling	\$359192
90730	Merging Spatially Variant Physical Process Models Under an Optimized Systems Dynamics Framework	\$427987
91991	Nanostructured Surfaces for Microfluidics and Sensing Applications	\$129991
93361	Fundamentals of Embossing Nanoimprint Lithography in Polymer Substrates	\$53902
93362	Rational Understanding and Control of the Magnetic Behavior of Nanoparticles	\$50000
93364	MEMS Dual Backplate Capacitive Microphone	\$12902
93366	Process Science and Engineering for Thermomechanical Nano-manufacturing	\$20000
93369	Fabrication and Device Applications of Aligned Mesoporous Architectures	\$50000
93414	Remote Sensing of End-Event Timing for High-Fidelity JTAs	\$333606
93415	A Modern Nuclear Weapon Communications Architecture	\$437430
93416	Improved Power Source for Doubling the Exchange Time Interval of LLC	\$266889
93417	Advanced Optical Trigger Systems for Firing Sets in Nuclear Weapons	\$404034
93418	Increasing the Accuracy of Vision-Based Dimensional Metrology	\$148161
93419	Advanced Surety Concepts	\$496813
93421	High Kinetic Energy Ion Source	\$203691
93422	Mentor/PAL	\$296136
93423	Identification of Threats Using Linguistics-Based Knowledge Extraction	\$327947

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
93425	UV or IR Fluorescing Sensor for Explosive Material Components	\$123115
93426	Large Scale Manufacturing of Integrated Nanostructures for Sensing	\$309497
93427	Development and Optimization of Thermal Protection Materials for Hypersonic Vehicles	\$775002
93491	Titanium Cholla - Optimized, Lightweight, High Strength Structures for Aerospace Applications	\$281776
93492	In Situ Optical Diagnostics of Neutron Generator Target Films	\$188761
93493	Low Cost, Meso-Scale Parts Fabricated from Nanocrystalline Metals	\$395481
93494	New Low Cost Material Development Technique For Advancing Rapid Prototyping Manufacturing Technology	\$199284
93495	Advanced Manufacturing of a Novel Functional Material	\$423050
93496	Interface Physics in Microporous Media	\$376380
93497	Creating a Discovery Platform for Defined-space Chemistry and Materials: Metal Organic Frameworks	\$369243
93498	Virulence Membrane Protein Organization and Complex Formation in Francisella novicida	\$387411
93499	Cell Modeling with Heterogeneous, Dynamic Cell Membranes	\$407547
93500	Membrane Analysis of the Plague Bacterium Yersinia Pestis During Flea to Mammalian Host Adaptation	\$297180
93501	Shotgun Protein Sequencing	\$328514
93503	A Numerical And Experimental Characterization Of Decontaminating Water Distribution Networks	\$487428
93505	Distributed Micro-releases of Bioterror Pathogens: Threat Characterization and Epidemiology from Uncertain Patient Observables	\$245805
93506	Large Scale Simulation for Human Behavior Modeling	\$430024
93507	Network Architecture Design for Next Generation Supercomputers	\$442638
93508	Quantum Computer Architecture, Software, and Applications	\$664114
93510	Robust Tunable Multi-function Amplifiers Using GaN and RF MEMS Technology	\$303908
93511	Bloch Oscillations in Two-Dimensional Nanostructure Arrays for High Frequency Applications	\$378227
93512	Inverted Monolithic Interconnected Module (MIM) Thermophotovoltaics (TPV) for Remote Power Generation	\$308827

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
93513	A Discovery Platform for Nanowire Electronics and Photonics	\$421659
93515	Miniature Flow Cytometer for Medical Diagnostics and Pathogen Detection	\$411928
93516	Just in Time Jamming of Enemy Detonation Signals	\$326506
93518	Ultrasensitive Directional Microphone Arrays for Military Operations in Urban Terrain and Future Combat Systems	\$280832
93519	High Power Broadly Tunable Mid-IR Quantum Cascade Lasers for Improved Chemical Species Detection	\$240767
93520	Si-rich Silicon Nitride Films for Reliable Low Write Voltage Anti-fuses	\$127522
93521	Terahertz-based Target Typing and Kill Assessment	\$273976
93522	Developing Key Capabilities for Quantum Computing	\$959602
93525	Multi-Length Scale Algorithms for Failure Modeling in Solid Mechanics	\$266790
93528	Nanocrystalline Aluminum Alloys for Structural Applications	\$441986
93529	Nanoparticle Flow, Ordering and Self-Assembly	\$382608
93530	Development of Simulation and Validation Techniques for the Dynamic Behavior of Metals at the Grain Scale	\$180223
93531	Dynamic Compression of Synthetic Diamond Windows	\$198607
93532	Fast High Voltage Spark Gap Switch With a Phase Changing Dielectric	\$351072
93533	Development of a Physics Understanding of Pulsed Power Closing Switches for Multiple LTD Applications	\$358188
93534	High Current Carbon-Nanotube Electron Sources	\$179577
93535	Precision Electron Flow Measurements in a Disk Transmission Line	\$202577
93536	Responding to the Identified Gap and National Needs in Early Bio-response	\$120177
93537	Viral Vectors for Gene Modification of Plants as Chem/Bio Sensors	\$126461
93538	LIGA-Fabricated Composite Right/Left-Handed Metamaterials	\$154028
93539	Active Assembly for Large-Scale Manufacturing of Integrated Nanoelectronics	\$119224
93540	Molecular Electronics: Theory and Experiment	\$118176
93541	Design and Synthesis of Tailored Multi-Dimensional Nanoscale Structures	\$156738
93542	Scanning Electron Microscope Doppler Vibrometer	\$92960
93543	Si Nanocrystal as Device Prototype for Spintronics Applications	\$114499
93544	Electrochemical Sensing Through Parallel Chemometric Diagnostics	\$162741

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
93545	Biological Detection and Tagging Using Tailorable, Reactive, Highly Fluorescent Chemosensors	\$123518
93547	Self-cleaning Synthetic Adhesive Surfaces Mimicking Tokay Geckos	\$121210
93548	Nano-Engineered Electroluminescent Polymers	\$101734
93549	Engineering Intracellular Active Transport Systems as In Vivo Biomolecular Tools	\$185752
93551	Self-assembled Nanoexplosives	\$96673
93552	Energy Infrastructure Surety Program for Military Applications	\$444185
93554	Hybrid Inorganic-Organic Polymer Composites for Improved Performance in Polymer-Electrolyte Fuel Cells	\$254662
93555	Enhanced Biomass to Bioenergy Interconversion through Protein and Metabolic Engineering	\$561519
93556	Joint Physical and Numerical Modeling of Water Distribution Networks	\$356099
93558	Computational and Experimental Study of Nanoporous Membranes for Water Desalination and Decontamination	\$489345
93559	Novel Virus Coagulants for Water Treatment and Biomolecular Structural Science	\$292816
93561	A Demonstration of Advanced Transparency At The Monju Fast Breeder Reactor	\$347149
93562	Reliability of Passive Safety Systems	\$236912
93563	Water-splitting Nanodevices for Solar Hydrogen Production	\$364382
93564	Development of Nanostructured and Surface Modified Semiconductors for Hybrid Organic-Inorganic Solar Cells	\$518225
93565	Cognitive Modeling of Human Behaviors	\$402508
93566	Massive Graph Visualization	\$207248
93567	A Dual Neutron+Gamma Source for the Fissmat Inspection for Nuclear Detection (FIND) System	\$328202
93568	Small Acid Soluble Proteins for Rapid Spore Identification	\$257231
93569	Parallel Computing in Enterprise Modeling: A Hybrid Approach	\$374514
93581	Enhanced NaI Scintillation Detectors	\$360081
93582	Portable Devices for Pen-Side Disease Diagnostics	\$336331
93583	Plastic Neutron Detectors	\$341505
93584	Scintillating Nanomaterials for New Radiation Detection Devices	\$459546

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
93585	Explosives Detection by Photo-Ionization Ion Mobility Spectrometry	\$426509
93586	Detection of Cell Phone and Wireless Systems	\$234717
93588	Transportable Liquid Metal Reactor System Design	\$89645
93589	Time-Frequency Enhanced Radar Processing for Foliage Penetration	\$87402
93590	Secure Portal	\$203024
93592	Human Perceptory Augmentation	\$594806
93593	Advanced Hard Target Warhead	\$609021
93594	Information System Situational Awareness	\$116126
93595	Human Performance Modeling for System of Systems Analytics	\$259416
93596	A Serious Game Engine for Complex Adaptive Systems Analysis and Training	\$168883
93597	Pulse Power Integration for Advanced Electric Weapons Platform	\$125495
93598	Terahertz Diagnostics for Impact-Flash Spectroscopy on Light-Gas Gun	\$459715
93600	Void Sensor for Penetrators	\$179780
93601	High Energy Density for Electric Weapons Platforms	\$222542
93602	Tracking Moving People With Radar Using High-Range-Resolution and Clutter Attenuation	\$198840
93603	Miniature Air-Deliverable Guided Sensor System	\$181445
93604	Nonmechanical Zoom Using Active Optics for Night Vision Goggles	\$84011
93605	The Physics of Threat/Target Interaction for Advanced Armor Development	\$441984
93607	Development of Nonproliferation and Assessment Scenarios	\$177327
93608	Photonics for Ultrawideband Intrasatellite Communications	\$467422
93609	Building Trusted Systems from Untrusted Components	\$554014
93610	Using Chaos for Ultrasensitive Coherent Signal Detection	\$129697
93611	Micromechanical Resonators Applied to Shock Hardened, Covert Communications	\$332561
93612	Infrared Detection and Power Generation Using Self-Assembled Quantum Dots	\$332357
93613	Ultra-Thin Ultra-High-Efficiency Heterostructure Micro-Cooler for Satellite Sensing Applications	\$354133
93615	Monolithically Integrated, Backside-Illuminated Photo Diode Array	\$404066
93616	Future Technology Approaches for Threat Warning Receivers	\$191154

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
93617	Shear Horizontal Surface Acoustic Wave Microsensors for Class A Viral and Bacterial Detection	\$318808
93618	Post-CMOS Compatible Aluminum Nitride Resonant Accelerometers	\$280428
93619	Hand Miniaturized BW Agent Detector for Real-time Detection of Concealed Agent Production	\$354297
93622	Development and Application of Quantitative Proliferation Resistance Methodologies for Reprocessing Scenarios	\$234345
93623	Modeling Expert Collaboration for National Intelligence Systems Engineering	\$138339
93625	Strategic Concepts for Information Superiority	\$517947
93626	Ultra Low Power Management Circuit Design	\$219824
93628	Multispectral Fusion for Beyond the Fence Intruder Detection and Assessment	\$255426
93629	Novel Design for Improved Nuclear EMP Detection	\$174069
93630	Adaptive Antenna Tuning for Miniaturized Tag Transceivers	\$150509
93631	Electrochromic Adaptive Optics for Novel Functionality of Earth-Staring Systems	\$206796
93633	New Hash Function for Data Protection	\$253833
93634	Binary Analysis for Embedded Environment	\$176583
93635	Software Evaluation in Virtualized Environment	\$443997
93636	Borazine Precursors for Boron Nitride Anti-Friction Coatings for MEMS	\$359768
93637	Multi-Scale Behavioral Analyses of Integrated Surety Designs	\$418861
93638	Decision Framing and Characterization Approaches for Complex Security Environments	\$191779
93639	Remotely Interrogated Passive Polarizing Dosimeter (RIPPeD)	\$285248
93641	New Approaches to Addressing the New Design Basis Threat	\$391792
93652	Atmospheric Aerosols	\$20548
94808	Human Interaction with Safety-Critical Interconnected Systems	\$177420
94809	Process and Infrastructure Development for Integrated Three-Dimensional Mesomanufacturing	\$48807
94810	Reliable and Secure Communication in Wireless Sensor Networks	\$50000
94811	Nanostructured Electrocatalyst for Fuel Cells: Silica Templated Synthesis of Pt/C Composites	\$25000

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SNL - Sandia National Lab

Project ID	Project Name	FY Total
94812	Piezoelectric Properties of Arrayed Nanostructures of Zinc Oxide for Sensor Applications	\$204183
94814	Three-dimensional Analysis for Nanoscale Materials Science	\$205788
94830	Tribological Studies of Microelectromechanical Systems	\$40000
95211	Highly Pixelated Hypertemporal Sensors for Global Awareness	\$1519143
95214	Terahertz Microelectronic Transceiver (T μ T) System	\$2677760
95215	Microscale Immune Study Laboratory (MISL)	\$4585133
96088	Tunnel Gap Modulation Spectroscopy: An Ultrasensitive Technique for Measuring Small Mass Change	\$25000
96299	Optical Properties of Plasmonic Metal-dielectric Composites	\$25000
97982	Membrane-based Water Purification for Removal of Arsenic and Biologically Active Small Molecules	\$26555
98104	Microfabricated Preconcentrator for Microscale Gas Chromatography	\$25000
98105	Dynamics of Propagating Shock Waves and Phase Fronts	\$25000
98294	Verification and Operation of Adaptive Materials in Space	\$33032
99405	Nanoporous Silica Templated Heteroepitaxy	\$130242
99406	Chiral Multichromic Single Crystals for Optical Devices	\$92024
99407	Molten Salt-Based Growth of Large-Area, High Quality Bulk Gallium Nitride for Substrates	\$191777
99864	Quantification of False Positive Reduction in Nucleic Acid Purification on Hemorrhagic Fever DNA	\$140665
99868	Large Atmospheric Explosions on Earth	\$48237
Total # of Projects for SNL:	430	Total Cost for SNL: \$129221459

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

SRP - Savannah River Plant

Project ID	Project Name	FY Total
SR05020	Electrical Heat Standards for Calorimetry	\$96054
SR05023	Modeling of Pressure Swing Adsorption Separation Process	\$61174
SR05027	Low Cost, High Flux Ni-Ti-Nb Hydrogen Purification/Separation Membrane Development	\$68033
SR05029	Synthesis of Metal Hydrides by Mechanical Alloying at Elevated Temperatures in a High Speed Attritor	\$38273
SR05033	Create New Rigorous Thermal-Cycling Absorption Process Model	\$73394
SR05041	Permeation-resistant Coated Gloves for Gloveboxes	\$104694
SR05047	Demonstration of Pressure Swing Adsorption (PSA) Separation Processes	\$129893
Total # of Projects for SRP:	7	Total Cost for SRP: \$571515

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

Y-12 - Y-12 Plant

Project ID	Project Name	FY Total
Y1202102	Fisk Rad Detectors	\$137205
Y1202103	Fuzzy Logic Analysis of Measurement	\$17791
Y1202105	UNCC Hole Plate	\$221029
Y1202106	UFL HSM	\$67024
Y1202107	NCSU Artifact	\$97537
Y1203001	Radiograph Archival	\$39075
Y1203014	High Accuracy, High Density	\$109083
Y1203039	Advanced SDOR	\$664350
Y1203043	ID of Ultra Fine Particles	\$3846
Y1203050	Lugless Casting	\$99187
Y1203075	Project 2	\$49132
Y1203076	Tech Infusion	\$80851
Y1204006	Cone Beam X-ray CAT scan	\$312426
Y1204019	Surface Metrology	\$264700
Y1204037	Process Radiation Detector System	\$237017
Y1204041	Slag Reprocessing	\$114423
Y1204045	Next Generation MW	\$919007
Y1204059	NMC&A Confirmatory Cart	\$87013
Y1204087	Direct Conversion to Oxide	\$25952
Y1204103	Precision Electroplating	\$3083
Y1204110	Crucible Materials Thermo Modeling	\$83104
Y1204127	Integrated Machining & Inspection at GT	\$41796
Y1204128	Source Model	\$6793
Y1204133	EMBOS	\$193085
Y1204134	Tusk Fracture Toughness with SSM	\$3060
Y1204135	UM - Optimet	\$113248
Y1204136	Portable Metal Analyzer	\$62995
Y1204137	UNCC Improving Machine Tool Productivity and Quality	\$223715
Y1204138	Machining Uranium and Uranium Alloys	\$187033

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

Y-12 - Y-12 Plant

Project ID	Project Name	FY Total
Y1204141	Ultrasonic Vibration of Molten Metals	\$22120
Y1204142	ANIPM Evaluation	\$216417
Y1205001	Reduce Holdup Measurement Uncertainty	\$45935
Y1205005	High Speed Machining of Difficult to Machine Materials	\$155338
Y1205012	Real-time Beryllium-in-Air Monitor Based on Passive Electric Spark	\$155962
Y1205013	Mobile Neutron Probe	\$23449
Y1205020	Miniature NC Turning and Milling Machine Integration	\$99630
Y1205030	Inverse Vibration Modeling and Parameter Estimation	\$134366
Y1205032	Microcantilever Transducers: Next Generation of Gas Diagnostics	\$240543
Y1205033	Enhancing Inductively-Coupled Plasma Mass Spectrometry with Ion Mobility	\$208758
Y1205040	Large Alpha-Uranium Single Crystals	\$77849
Y1205043	Conversion of Uranium Metal to Oxide	\$293181
Y1205045	Novel Material Synthesis (U)	\$89883
Y1205048	Purification of Uranium by Electrorefining	\$382234
Y1205064	Pin Extensions	\$178350
Y1205069	Personal Radiation Detection Instrumentation (PRDI) Alternatives	\$228113
Y1205072	Nanostructured Super Material Machine Tools	\$259575
Y1205082	WiMaX Networking	\$156859
Y1205084	Parylene Coating	\$103777
Y1205089	Advanced Hydrogen-Getter Analysis	\$87852
Y1205091	Debonding	\$199085
Y1205092	Material Cleaning Alternatives	\$215161
Y1205093	Special Casting Requirements	\$91423
Y1205094	Uranyl Nitrate Processing Evaluation	\$83975
Y1205095	Primary Extraction System Improvements	\$125335
Y1205096	Novel Approaches for Be Sample Analysis	\$190335
Y1205099	Bioassay Analysis by ICP-MS	\$342385
Y1205096	Denitration Alternatives	\$21979
Y1206001	High Quality Radiographic Film Digitization	\$140480

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2006

Y-12 - Y-12 Plant

Project ID	Project Name	FY Total
Y1206003	Light Beam Grid Network Safeguards Surveillance System	\$193791
Y1206004	Advanced Modeling of Microwave Processes	\$208721
Y1206007	Material Detection and Quantitation for NMC&A	\$283607
Y1206011	Investigation of Welding and Weld Quality Issues of Uranium Components	\$189145
Y1206019	Lithium Technologies	\$672830
Y1206025	Agile Machining Process Development	\$306752
Y1206027	Be Swipe Analyzer	\$167152
Y1206028	Portable Carbon in Uranium Analyzer	\$313230
Y1206031	Advanced Methods to Nondestructively Sense for Stress Corrosion Cracking Sites on Uranium Parts Using a Thermoelectric Power (Seebeck) Coefficient Surface Contact Probe	\$182712
Y1206032	Physics-Based Systems Integration for Y-12 Modernization	\$209855
Y1206033	Interface UT 3-D Imaging Technology with LC-SEM	\$89924
Y1206035	Agile Machine Chip Monitor	\$83743
Y1206036	Casting Mold Temperature Measurement	\$179412
Y1206038	Improving Beryllium Analysis Through Computational Deconvolution	\$180908
Y1206044	Lithium Operations Modernization and Downsizing	\$11152
Y1206054	RFID and Automated Barcode Evaluation for NMC&A Modernized Facility	\$234762
Y1206055	In-Process Monitoring for NMC&A Modernized Facility	\$74078
Y1206057	Advanced Infrared (IR) Heating Techniques for Materials Processing	\$682773
Y1206060	Recovery of Materials	\$127246
Y1206075	Total Oxygen Analysis	\$19976
Total # of Projects for Y-12:	78	Total Cost for Y-12: \$13446678

Departmental Procedures

The Conference Report accompanying the Energy and Water Development Appropriations Act for Fiscal Year 2002 (H.R. 4733) requests the Secretary of Energy to include in the annual report to Congress for all Laboratory Directed Research and Development (LDRD) activities the affirmation included below. In response to and as support for the annual affirmation, the Department revised its procedures for handling LDRD program charges on other Federal agency funded Work for Others projects in fiscal year 2002. These procedures changed the Work for Others process to ensure proper notification of other Federal agencies as to the LDRD charges prior to funding work at the laboratory. Specifically, each new and/or revised Work for Others proposal provided to a Federal agency must indicate the amount of LDRD charges that will be collected. Furthermore, the proposal notifies the sponsor that, by providing funding, the agency is acknowledging LDRD activities are beneficial to their organization and consistent with appropriation acts providing funds to that agency. Subsequently, each Work for Others funding acceptance document also includes the LDRD estimate acknowledgement.

FY 2006 Secretarial Affirmation

Based on the information and acknowledgments provided to the Department of Energy and its contractors by other Federal agencies funding LDRD activities at DOE facilities, I affirm that all LDRD activities derived from funds of other Federal agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts that provided funds to those agencies.


Samuel W. Bodman

December 19, 2006
Date